LaTeX Class for the *Association for Computing Machinery**

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Abstract

This package provides a class for typesetting publications of the Association for Computing Machinery.

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1 Introduction

The Association for Computing Machinery[1] is the world's largest educational and scientific computing society, which delivers resources that advance computing as a science and a profession. It was one of the early adopters of TEX for its typesetting.

It provided several different classes for a number of journals and conference proceedings. Unfortunately during the years since these classes were written, the code was patched many times, and supporting different versions of the classes became difficult.

This package provides the uniform interface for all ACM publications. It is intended to replace all the different classes and packages and provide an up-to-date LATEX package.

This package uses only free TEX packages and fonts included in TEXLive, MikTEX and other popular TEX distributions. It is intended to be published in these distributions itself, which minimizes users' efforts in the installation and support of this package.

I am grateful to Michael D. Adams, Leif Andersen, Dirk Beyer, Benjamin Byholm, Michael Ekstrand, Matthew Fluet, Paolo G. Giarrusso, Ben Greenman, Jamie Davis, LianTze Lim, Ben Liblit, Kai Mindermann, Frank Mittelbach, Serguei Mokhov, Ross Moore, John Owens, Joel Nider, Tobias Pape, Mathias Rav, Andreas Reichinger, Matteo Riondato, Craig Rodkin, Bernard Rous, David Shamma, Stephen Spencer, Daniel Thomas, Zack Weinberg, John Wickerson and many others for their invaluable help.

The development version of the package is available at https://github.com/borisveytsman/acmart.

2 User's guide

This class uses many commands and customizaton options, so it might appear intimidating for a casual user. Do not panic! Many of these commands and options can be safely left with their default values or the values recommended by your conference or journal editors. If you have problems or questions, do not hesitate to ask me directly or the community at https://github.com/borisveytsman/acmart, https://tex.stackexchange.com or the closest TEX Users Group. The world-wide TEX Users Group is at https://tug.org/; please consider joining us if you use TEX regularly.

2.1 Installation

Most probably, you already have this package installed in your favorite TEX distribution; if not, you may want to upgrade. You may need to upgrade it anyway since this package uses a number of relatively recent packages, especially the ones related to fonts.

The latest released version of this package can be found on CTAN: https://www.ctan.org/pkg/acmart. The development version can be found on GitHub: https://github.com/borisveytsman/acmart. At this address you can file a bug report—or even contribute your own enhancement by making a pull request.

Please note that the version on Github is a development (or experimental) version: please download it for testing new features. The production version is the one on CTAN and ACM sites.

[1] http://www.acm.org/

Most users should not attempt to install this package themselves but should rather rely on their TEX distributions to provide it. If you decide to install the package yourself, follow the standard rules:

1. Run `latex acmart.ins`. This will produce the file `acmart.cls`
2. Put the files `acmart.cls` and `ACM-Reference-Format.bst` in places where LATEX can find them (see [1] or the documentation for your TEX system).
3. Update the database of file names. Again, see [1] or the documentation for your TEX system for the system-specific details.
4. The file `acmart.pdf` provides the documentation for the package. (This is probably the file you are reading now.)

As an alternative to items 2 and 3 you can just put the files in the working directory where your `.tex` file is.

This class uses a number of other packages. They are included in all major TEX distributions (TEXLive, MacTEX, MikTEX) of 2015 and later, so you probably have them installed. Just in case here is the list of these packages:

- *amscls*, http://www.ctan.org/pkg/amscls
- *amsfonts*, http://www.ctan.org/pkg/amsfonts
- *amsmath*, http://www.ctan.org/pkg/amsmath
- *binhex*, http://www.ctan.org/pkg/binhex
- *caption*, http://www.ctan.org/pkg/caption
- *comment*, http://www.ctan.org/pkg/comment
- *cm-super*, http://www.ctan.org/pkg/cm-super
- *cmap*, http://www.ctan.org/pkg/cmap
- *draftwatermark*, http://www.ctan.org/pkg/draftwatermark
- *environ*, http://www.ctan.org/pkg/environ
- *etoolbox*, http://www.ctan.org/pkg/etoolbox
- *fancyhdr*, http://www.ctan.org/pkg/fancyhdr
- *float*, http://www.ctan.org/pkg/float
- *fontaxes*, http://www.ctan.org/pkg/fontaxes
- *geometry*, http://www.ctan.org/pkg/geometry
- *graphics*, http://www.ctan.org/pkg/graphics
- *hyperref*, http://www.ctan.org/pkg/hyperref

- *ifluatex*, http://www.ctan.org/pkg/ifluatex
- *ifxetex*, http://www.ctan.org/pkg/ifxetex
- *inconsolata*, http://www.ctan.org/pkg/inconsolata
- *libertine*, http://www.ctan.org/pkg/libertine
- *manyfoot*, http://www.ctan.org/pkg/manyfoot
- *microtype*, http://www.ctan.org/pkg/microtype
- *mmap*, http://www.ctan.org/pkg/mmap
- *ms*, http://www.ctan.org/pkg/ms
- *mweights*, http://www.ctan.org/pkg/mweights
- *natbib*, http://www.ctan.org/pkg/natbib
- *nccfoots*, http://www.ctan.org/pkg/nccfoots
- *newtx*, http://www.ctan.org/pkg/newtx
- *oberdiek*, http://www.ctan.org/pkg/oberdiek
- *pdftex-def*, http://www.ctan.org/pkg/pdftex-def
- *refcount*, http://www.ctan.org/pkg/refcount
- *setspace*, http://www.ctan.org/pkg/setspace
- *textcase*, http://www.ctan.org/pkg/textcase
- *totpages*, http://www.ctan.org/pkg/totpages
- *trimspaces*, http://www.ctan.org/pkg/trimspaces
- *upquote*, http://www.ctan.org/pkg/upquote
- *url*, http://www.ctan.org/pkg/url
- *xcolor*, http://www.ctan.org/pkg/xcolor
- *xkeyval*, http://www.ctan.org/pkg/xkeyval
- *xstring*, http://www.ctan.org/pkg/xstring

2.2 Invocation and options

To use this class, put in the preamble of your document

```
\documentclass[⟨options⟩]{acmart}
```

There are several options corresponding to the type of the document and its general appearance. They are described below. Generally speaking, the options have `key=value` forms, for example,

```
\documentclass[format=acmsmall, screen=true, review=false]{acmart}
```

The option `format` describes the format of the output. There are several possible values for this option, for example,

```
\documentclass[format=acmtog]{acmart}
```

Actually the words `format=` can be omitted, e.g.,

```
\documentclass[acmtog, review=false]{acmart}
```

The possible formats are listed in Table 1. Note that formats starting with `acm` are intended for journals and transactions, while formats starting with `sig` are intended for proceedings published as books.

Note that sometimes conference proceedings are published as a special issue (or issues) of an ACM journal. In this case, you should use the journal format for a conference paper. Please contact your conference committee if in doubt.

There are several Boolean options that can take `true` or `false` values. They are listed in Table 2. The words `=true` can be omitted when setting a Boolean option, so instead of `screen=true` one can write just `screen`, for example,

```
\documentclass[acmsmall, screen, review]{acmart}
```

The option `review` is useful when combined with the `manuscript` format option. It provides a version suitable for reviewers and copy editors.

The default for the option `screen` depends on the publication. At present it is `false` for all publications *but* PACM, since PACM is now electronic-only. Thus PACM titles (see Table 3) set this option to `true`. In the future this option may involve additional features suitable for on-screen versions of articles.

The option `natbib` is used when the corresponding BibTeX style is based on `natbib`. In most cases you do not need to set it. See Section 2.10.

The option `anonymous` is used for anonymous review processes and causes all author information to be obscured.

The option `timestamp` is used to include a time stamp in the footer of each page. When preparing a document, this can help avoid confusing different revisions. The footer also includes the page range of the document. This helps detect missing pages in hard copies.

Table 1: The possible values for the `format` option

Value	Meaning
`manuscript`	A manuscript. This is the default.
`acmsmall`	Small single-column format. Used for CIE, CSUR, DTRAP, JACM, JDIQ, JEA, JERIC, JETC, PACMHCI, PACMPL, TAAS, TACCESS, TACO, TALG, TALLIP (formerly TALIP), TCPS, TEAC, TECS, THRI, TIIS, TISSEC, TIST, TKDD, TMIS, TOCE, TOCHI, TOCL, TOCS, TOCT, TODAES, TODS, TOIS, TOIT, TOMACS, TOMM (formerly TOMCCAP), TOMPECS, TOMS, TOPC, TOPLAS, TOPS, TOS, TOSEM, TOSN, TRETS, TSAS, TSC, TSLP and TWEB, including special issues.
`acmlarge`	Large single-column format. Used for IMWUT, JOCCH, POMACS and TAP, including special issues.
`acmtog`	Large double-column format. Used for TOG, including annual conference Technical Papers.
`sigconf`	Proceedings format for most ACM conferences (with the exceptions listed below) and all ICPS volumes.
`sigplan`	Proceedings format for SIGPLAN conferences.
`sigchi`	Proceedings format for SIGCHI conferences.
`sigchi-a`	Format for SIGCHI extended abstracts.

The option `authordraft` is intended for author's drafts that are not intended for distribution. It typesets a copyright block to give the author an idea of its size and the overall size of the paper but overprints it with the phrase "Unpublished working draft. Not for distribution.", which is also used as a watermark. This option sets `timestamp` and `review` to `true`, but these can be overriden by setting these options to `false` *after* setting `authordraft` to `true`.

2.3 Top matter

A number of commands set up *top matter* or (in computer science jargon) *metadata* for an article. They establish the publication name, article title, authors, DOI and other data. Some of these commands, like `\title` and `\author`, should be put by the authors. Others, like `\acmVolume` and `\acmDOI`—by the editors. Below we describe these commands and mention who should issue them. These macros should be used *before* the `\maketitle` command. Note that in previous versions of ACM classes some of these commands should be used before `\maketitle`, and some after it. Now they all must be used before `\maketitle`.

This class internally loads the `amsart` class, so many top-matter commands are inherited from `amsart` [2].

`\acmJournal` The macro `\acmJournal{`⟨*shortName*⟩`}` sets the name of the journal or transaction for journals and transactions. The argument is the short name of the publication *in uppercase*, for example,

```
\acmJournal{TOMS}
```

Table 2: Boolean options

Option	Default	Meaning
`review`	`false`	A review version: lines are numbered and hyperlinks are colored
`screen`	see text	A screen version: hyperlinks are colored
`natbib`	`true`	Whether to use the `natbib` package (see Section 2.10)
`anonymous`	`false`	Whether to make author(s) anonymous
`authorversion`	`false`	Whether to generate a special version for the authors' personal use or posting (see Section 2.3)
`timestamp`	`false`	Whether to put a time stamp in the footer of each page
`authordraft`	`false`	Whether author's-draft mode is enabled
`acmthm`	`true`	Whether to define theorem-like environments, see Section 2.6

The currently recognized journals are listed in Table 3. Note that conference proceedings published in *book* form do not set this macro.

It is expected that this command is inserted by the author of the manuscript when she decides to which journal to submit the manuscript.

`\acmConference` The macro `\acmConference[`⟨*short name*⟩`]{`⟨*name*⟩`}{`⟨*date*⟩`}{`⟨*venue*⟩`}` is used for conference proceedings published in the book form. The arguments are the following:

short name: the abbreviated name of the conference (optional).

name: the name of the conference.

date: the date(s) of the conference.

venue: the place of the conference.

Examples:

```
\acmConference[TD'15]{Technical Data Conference}{November
12--16}{Dallas, TX, USA}
\acmConference{SA'15 Art Papers}{November 02--06, 2015}{Kobe, Japan}
```

`\acmBooktitle` By default we assume that conference proceedings are published in the book named *Proceedings of CONFERENCE*, where CONFERENCE is the name of the conference inferred from the command `\acmConference` above. However, sometimes the book title is different. The command `\acmBooktitle` can be used to set this title, for example,

```
\acmBooktitle{Companion to the first International Conference on the
Art, Science and Engineering of Programming (Programming '17)}
```

Table 3: ACM publications and arguments of the `\acmJournal` command

Abbreviation	Publication
CIE	ACM Computers in Entertainment
CSUR	ACM Computing Surveys
DTRAP	Digital Threats: Research and Practice
IMWUT	PACM on Interactive, Mobile, Wearable and Ubiquitous Technologies
JACM	Journal of the ACM
JDIQ	ACM Journal of Data and Information Quality
JEA	ACM Journal of Experimental Algorithmics
JERIC	ACM Journal of Educational Resources in Computing
JETC	ACM Journal on Emerging Technologies in Computing Systems
JOCCH	ACM Journal on Computing and Cultural Heritage
PACMHCI	PACM on Human-Computer Interaction
PACMPL	PACM on Programming Languages
POMACS	PACM on Measurement and Analysis of Computing Systems
TAAS	ACM Transactions on Autonomous and Adaptive Systems
TACCESS	ACM Transactions on Accessible Computing
TACO	ACM Transactions on Architecture and Code Optimization
TALG	ACM Transactions on Algorithms
TALLIP	ACM Transactions on Asian and Low-Resource Language Information Processing
TAP	ACM Transactions on Applied Perception
TCPS	ACM Transactions on Cyber-Physical Systems
TEAC	ACM Transactions on Economics and Computation
TECS	ACM Transactions on Embedded Computing Systems
THRI	ACM Transactions on Human-Robot Interaction
TIIS	ACM Transactions on Interactive Intelligent Systems
TISSEC	ACM Transactions on Information and System Security
TIST	ACM Transactions on Intelligent Systems and Technology
TKDD	ACM Transactions on Knowledge Discovery from Data
TMIS	ACM Transactions on Management Information Systems
TOCE	ACM Transactions on Computing Education
TOCHI	ACM Transactions on Computer-Human Interaction
TOCL	ACM Transactions on Computational Logic
TOCS	ACM Transactions on Computer Systems
TOCT	ACM Transactions on Computation Theory
TODAES	ACM Transactions on Design Automation of Electronic Systems
TODS	ACM Transactions on Database Systems
TOG	ACM Transactions on Graphics
TOIS	ACM Transactions on Information Systems
TOIT	ACM Transactions on Internet Technology
TOMACS	ACM Transactions on Modeling and Computer Simulation
TOMM	ACM Transactions on Multimedia Computing, Communications and Applications
TOMPECS	ACM Transactions on Modeling and Performance Evaluation of Computing Systems
TOMS	ACM Transactions on Mathematical Software
TOPC	ACM Transactions on Parallel Computing
TOPLAS	ACM Transactions on Programming Languages and Systems
TOPS	ACM Transactions on Privacy and Security
TOS	ACM Transactions on Storage
TOSEM	ACM Transactions on Software Engineering and Methodology
TOSN	ACM Transactions on Sensor Networks
TRETS	ACM Transactions on Reconfigurable Technology and Systems
TSAS	ACM Transactions on Spatial Algorithms and Systems
TSC	ACM Transactions on Social Computing
TSLP	ACM Transactions on Speech and Language Processing
TWEB	ACM Transactions on the Web

\editor In most cases, conference proceedings are edited. You can use the command \editor{⟨*editor*⟩} to set the editor of the volume. This command can be repeated, for example,

```
\editor{Jennifer B. Sartor}
\editor{Theo D'Hondt}
\editor{Wolfgang De Meuter}
```

\title The command \title, as in the amsart class, has two arguments: one optional, and one mandatory:

\title[⟨*ShortTitle*⟩]{⟨*FullTitle*⟩}

The mandatory argument is the full title of the article. The optional argument, if present, defines the shorter version of the title for running heads. If the optional argument is absent, the full title is used instead.

It is expected that this command is inserted by the author of the manuscript.

\subtitle Besides title, ACM classes allow a subtitle, set with the \subtitle{⟨*subtitle*⟩} macro.

The commands for specifying authors are highly structured. The reason is they serve double duty: the authors' information is typeset in the manuscript *and* is used by the metadata extraction tools for indexing and cataloguing. Therefore it is very important to follow the guidelines exactly.

\author \orcid \affiliation \email The basic commands are \author, \orcid (for the researchers registered with ORCID, http://www.orcid.org/), \affiliation and \email. In the simplest case, you enter them in this order:

```
\author{...}
\orcid{...}
\affiliation{...}
\email{...}
```

Do *not* use the LaTeX \and macro! Each author deserves his or her own \author command.

Note that some formats do not typset e-mails or ORCID identifiers. Do not worry: the metadata tools will get them.

Sometimes an author has several affiliations. In this case, the \affiliation command should be repeated:

```
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
```

Similarly you can repeat the \email command.

You may have several authors with the same affiliation, different affiliations, or overlapping affiliations (author A_1 is affiliated with institutions I_1 and I_2, while author A_2 is

affiliated with I_2 only, author A_3 is affiliated with I_1 and I_3, etc.). The recommended solution is to put the `\affiliation` commands after each author, possibly repeating them:

```
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
\author{...}
\orcid{...}
\affiliation{...}
\email{...}
\author{...}
\orcid{...}
\affiliation{...}
\affiliation{...}
\email{...}
```

In some cases, when several authors share the same affiliation, you can try to save space using the format

```
\author{...}
\email{...}
\author{...}
\email{...}
\affiliation{...}
```

However, this format is not generally recommended.

`\additionalaffiliation` In some cases, too many affiliations can take too much space. The command `\additionalaffiliation{`⟨*affiliation*⟩`}` creates a footnote after an author's name with the words "Also with {⟨*affiliation*⟩}". You should use this command only as a last resort. An example of usage is:

```
\author{G. Tobin}
\author{Ben Trovato}
\additionalaffiliation{%
  \institution{The Th{\o}rv{\"a}ld Group}
  \streetaddress{1 Th{\o}rv{\"a}ld Circle}
  \city{Hekla}
  \country{Iceland}}
\affiliation{%
  \institution{Institute for Clarity in Documentation}
  \streetaddress{P.O. Box 1212}
  \city{Dublin}
  \state{Ohio}
  \postcode{43017-6221}}
```

Here Trovato and Tobin share their affiliation with the Institute for Clarity in Documentation, but only Ben Trovato is affiliated with The Thørväld Group.

\position
\institution
\department
\streetaddress
\city
\state
\postcode
\country

The \affiliation and \additionalaffiliation commands are further structured to interact with the metadata extraction tools. Inside these commands you should use the \position, \institution, \department, \city, \streetaddress, \state, \postcode and \country macros to indicate the corresponding parts of the affiliation. Note that in some cases (for example, journals) these parts are not printed in the resulting copy, but they *are* necessary since they are used by the XML metadata extraction programs. Do *not* put commas or \\ between the elements of \affiliation. They will be provided automatically.

An example of the author block:

```
\author{A. U. Thor}
\orcid{1234-4564-1234-4565}
\affiliation{%
  \institution{University of New South Wales}
  \department{School of Biomedical Engineering}
  \streetaddress{Samuels Building (F25), Kensington Campus}
  \city{Sidney}
  \state{NSW}
  \postcode{2052}
  \country{Australia}}
\email{author@nsw.au.edu}
\author{A. N. Other}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}
\author{C. O. Respondent}
\orcid{1234-4565-4564-1234}
\affiliation{%
  \institution{University of Pennsylvania}
  \city{Philadelphia}
  \state{PA}
  \country{USA}}
\affiliation{%
  \institution{University of New South Wales}
  \city{Sidney}
  \state{NSW}
  \country{Australia}}
```

Note that the old ACM conference formats did not allow more than six authors and required some effort from authors to achieve alignment. The new format is much better in this.

Sometimes an author works in several departments within the same insitution. There could be two situations: the departments are independent, or one department is within another. In the first case, just repeat the command \department several times. To handle

the second case the command has an optional numerical parameter. The departments with higher numbers are higher in the organizational chart. Compare

```
\affiliation{%
  \department[0]{Department of Lunar Studies} % 0 is the default
  \department[1]{John Doe Institute} % higher than 0
  \institution{University of San Serriffe}
  \country{San Serriffe}}
```

and

```
\affiliation{%
  \department{Department of Lunar Studies} % Not in the John Doe Institute!
  \department{John Doe Institute}
  \institution{University of San Serriffe}
  \country{San Serriffe}}
```

The command `\affiliation` formats its output according to American conventions. This might be wrong for some cases. Consider, for example, a German address. In Germany, the postcode is put before the city and is not separated by a comma. We can handle this order using

```
\affiliation{%
  \institution{Fluginstitut}
  \streetaddress{Sonnenallee 17}
  \postcode{123456}
  \city{Helm}
  \country{Germany}}
```

However, the comma after the postcode is unfortunate: the address will be typeset (in some formats) as

```
Fluginstitut
Sonenallee 17
123456, Helm, Germany
```

To overcome this problem, the command `\affiliation` has an optional parameter `obeypunctuation`, which can be `false` (the default) or `true`. If this parameter is `true`, `\afffiliation` obeys the author's command. Thus

```
\affiliation[obeypunctuation=true]{%
  \institution{Fluginstitut}\\
  \streetaddress{Sonnenallee 17}\\
  \postcode{123456}
  \city{Helm},
  \country{Germany}}
```

will be typeset as

```
Fluginstitut
Sonenallee 17
123456 Helm, Germany
```

Note that you should *not* use this option for journals.

It is expected that these commands are inserted by the author of the manuscript.

\thanks Like amsart (and unlike standard LaTeX), we allow \thanks only *outside* of the commands \title and \author. This command is obsolete and should *not* be used in most cases. Do not list your acknowledgments or grant sponsors here. Put this information in the acks environment (see Section 2.9).

\authorsaddresses In some formats, addresses are printed as a footnote on the first page. By default LaTeX typesets them itself using the information you give it. However, you can override its choice using the commmand \authorsaddresses{⟨*contact addresses*⟩}, for example,

```
\authorsaddresses{%
 Authors' addresses: G.~Zhou, Computer Science Department, College of
 William and Mary, 104 Jameson Rd, Williamsburg, PA 23185, US;
 V.~B\'eranger, Inria Paris-Rocquencourt, Rocquencourt, France;
 A.~Patel, Rajiv Gandhi University, Rono-Hills, Doimukh, Arunachal
 Pradesh, India; H.~Chan, Tsinghua University, 30 Shuangqing Rd,
 Haidian Qu, Beijing Shi, China; T.~Yan, Eaton Innovation Center,
 Prague, Czech Republic; T.~He, C.~Huang, J.~A.~Stankovic University
 of Virginia, School of Engineering Charlottesville, VA 22903, USA;
 T. F. Abdelzaher, (Current address) NASA Ames Research Center,
 Moffett Field, California 94035.}
```

You can *suppress* printing authors' addresses by setting them to an empty string: \authorsaddresses{}.

\titlenote \subtitlenote \authornote While the command \thanks generates a note without a footnote mark, sometimes the authors might need notes more tightly connected to the title, subtitle or author. The commands \titlenote, \subtitlenote and \authornote that follow the corresponding commands (\title, \subtitle and \author) generate such notes. For example,

```
\title{This is a title}
\titlenote{This is a titlenote}
\author{A. U. Thor}
\authornote{This is an authornote}
```

Please never use a \footnote inside an \author or \title command since this confuses the metadata extraction software. (Actually these commands now produce errors.)

\authornotemark Sometimes one may need to have the same footnote connected to several authors. The command \authornotemark[⟨*number*⟩] adds just the footnote mark, for example,

```
\author{A. U. Thor}
\authornote{Both authors contributed equally to the paper}
```

```
...
\author{A. N. Other}
\authornotemark[1]
```

The correct numbering of these marks is the responsibility of the user.

\acmVolume
\acmNumber
\acmArticle
\acmYear
\acmMonth

The macros \acmVolume, \acmNumber, \acmArticle, \acmYear and \acmMonth are inserted by the editor and set the journal volume, issue, article number, year and month corrspondingly. The arguments of all these commands, including \acmMonth, is numerical. For example,

```
\acmVolume{9}
\acmNumber{4}
\acmArticle{39}
\acmYear{2010}
\acmMonth{3}
```

Note that \acmArticle is used not only for journals but also for some conference proceedings.

\acmArticleSeq

The articles in the same issue of a journal have a *sequence number*. It is used to vertically position the black blob on the first page of some formats. By default it is the same as the article number, but the command \acmArticleSeq{⟨*n*⟩} can be used to change it:

```
\acmArticle{39}   % The sequence number will be 39 by default
\acmArticleSeq{5} % We redefine it to 5
```

Setting this number to zero suppresses the blob.

\acmSubmissionID

If your paper got a Submission ID from the Conference Management System, put it here:

```
\acmSubmissionID{123-A56-BU3}
```

\acmPrice

The macro \acmPrice{⟨*price*⟩} sets the price for the article, for example,

```
\acmPrice{25.00}
```

Note that you do not need to put the dollar sign here, just the amount. By default the price is $15.00, unless the copyright is set to usgov or rightsretained, when it is suppressed. Note that to override the defaults you need to set the price *after* the \setcopyright command. Also, the command \acmPrice{} suppresses the printing of the price.

\acmISBN

Book-like volumes have ISBN numbers attached to them. The macro \acmISBN{⟨*ISBN*⟩} sets it. Normally it is set by the typesetter, for example,

```
\acmISBN{978-1-4503-3916-2}
```

Setting it to the empty string, as `\acmISBN{}`, suppresses printing the ISBN.

`\acmDOI` The macro `\acmDOI{`⟨*DOI*⟩`}` sets the DOI of the article, for example,

```
\acmDOI{10.1145/9999997.9999999}
```

It is normally set by the typesetter. Setting it to the empty string, as `\acmDOI{}`, suppresses the DOI.

`\acmBadgeR` `\acmBadgeL` Some conference articles get special distinctions, for example, the artifact evaluation for PPoPP 2016 (see http://ctuning.org/ae/ppopp2016.html). These articles display special badges supplied by the conference organizers. This class provides commands to add these badges: `\acmBadgeR[`⟨*url*⟩`]{`⟨*graphics*⟩`}` and `\acmBadgeL[`⟨*url*⟩`]{`⟨*graphics*⟩`}`. The first command puts the badge to the right of the title, and the second one—to the left. The exception is the `sigchi-a` mode for SIGCHI extended abstracts, which puts the badges on the left margin. The arguments have the following meaning: `[`⟨*url*⟩`]`, if provided, sets the link to the badge authority in the screen version, while `{`⟨*graphics*⟩`}` sets the graphics file with the badge image. The file must be a cropped square, which is scaled to a standard size in the output. For example, if the badge image is `ae-logo.pdf`, the command is

```
\acmBadgeR[http://ctuning.org/ae/ppopp2016.html]{ae-logo}
```

`\startPage` The macro `\startPage{`⟨*page*⟩`}` sets the first page of the article in a journal or book. It is used by the typesetter.

`\terms` `\keywords` The command `\keywords{`⟨*keyword, keyword,...*⟩`}` sets keywords for the article. They must be separated by commas, for example,

```
\keywords{wireless sensor networks, media access control,
multi-channel, radio interference, time synchronization}
```

`CCSXML` `\ccsdesc` ACM publications are classified according to the ACM Computing Classification Scheme (CCS). CCS codes are used both in the typeset version of the publications *and* in the metadata in various databases. Therefore you need to provide both TEX commands and XML metadata with the paper.

The tool at http://dl.acm.org/ccs.cfm can be used to generate CCS codes. After you select the topics, click on "Generate CCS codes" to get results like the following:

```
\begin{CCSXML}
<ccs2012>
 <concept>
  <concept_id>10010520.10010553.10010562</concept_id>
  <concept_desc>Computer systems organization~Embedded systems</concept_desc>
  <concept_significance>500</concept_significance>
 </concept>
 <concept>
  <concept_id>10010520.10010575.10010755</concept_id>
  <concept_desc>Computer systems organization~Redundancy</concept_desc>
  <concept_significance>300</concept_significance>
```

```
 </concept>
 <concept>
  <concept_id>10010520.10010553.10010554</concept_id>
  <concept_desc>Computer systems organization~Robotics</concept_desc>
  <concept_significance>100</concept_significance>
 </concept>
 <concept>
  <concept_id>10003033.10003083.10003095</concept_id>
  <concept_desc>Networks~Network reliability</concept_desc>
  <concept_significance>100</concept_significance>
 </concept>
</ccs2012>
\end{CCSXML}

\ccsdesc[500]{Computer systems organization~Embedded systems}
\ccsdesc[300]{Computer systems organization~Redundancy}
\ccsdesc{Computer systems organization~Robotics}
\ccsdesc[100]{Networks~Network reliability}
```

You just need to copy this code and paste it in your paper anywhere before `\maketitle`.

`\setcopyright` There are several possibilities for the copyright of the papers published by the ACM: the authors may transfer the rights to the ACM, license them to the ACM, some or all authors might be employees of the US or Canadian governments, etc. Accordingly the command `\setcopyright{...}` is introduced. Its argument is the copyright status of the paper, for example, `\setcopyright{acmcopyright}`. The possible values for this command are listed in Table 4.

The ACM submission software should generate the right command for you to paste into your file.

`\copyrightyear` Each copyright statement must have the year of copyright. By default it is the same as `\acmYear`, but you can override this using the macro `\copyrightyear`, e.g.,

```
\acmYear{2016}
\copyrightyear{2015}
```

There is a special case for a personal copy that the authors may be allowed to generate for their use or a posting on a personal site (check the instructions for the specific journal or conference for the details). The document option `authorversion=true` produces a special form of the copyright statement for this case. Note that you still need the `\setcopyright` command and (optionally) `\copyrightyear` command to tell TEX about the copyright owner and year. Also, you should be aware that due to the different sizes of the permssion blocks for the printed version and authors' version, the page breaks might be different between them.

`abstract` The environment `abstract` must *precede* the `\maketitle` command. Again, this is different from the standard LATEX.

`teaserfigure` A special kind of figure is used for many two-column conference proceedings.

Table 4: Parameters for the \setcopyright command

Parameter	Meaning
none	The copyright and permission information is not typeset. (This is the option for some ACM conferences.)
acmcopyright	The authors transfer the copyright to the ACM (the "traditional" choice).
acmlicensed	The authors retain the copyright but license the publication rights to the ACM.
rightsretained	The authors retain the copyright and publication rights to themselves or somebody else.
usgov	All the authors are employees of the US government.
usgovmixed	Some authors are employees of the US government.
cagov	All the authors are employees of the Canadian government.
cagovmixed	Some authors are employees of the Canadian government.
licensedusgovmixed	Some authors are employees of the US government, and the publication rights are licensed to the ACM.
licensedcagov	All the authors are employees of the Canadian government, and the publication rights are licensed to the ACM.
licensedcagovmixed	Some authors are employees of the Canadian government, and the publication rights are licensed to the ACM.
othergov	Authors are employees of a government other than the US or Canada.
licensedothergov	Authors are employees of a government other than the US or Canada, and the publication rights are licensed to the ACM.
iw3c2w3	Special statement for conferences organized by IW3C2.
iw3c2w3g	Special statement for conferences organized by IW3C2, when some authors are approved Google employees.

Table 5: Settings for the \settopmatter command

Parameter	Values	Meaning
printccs	true/false	Whether to print CCS categories
printacmref	true/false	Whether to print the ACM bibliographic entry
printfolios	true/false	Whether to print page numbers (folios)
authorsperrow	numeric	Number of authors per row for the title page in conference proceedings formats

This figure is placed just after the authors but before the main text. The environment teaserfigure is used for these figures. This environment must be used *before* \maketitle, for example,

```
\begin{teaserfigure}
  \includegraphics[width=\textwidth]{sampleteaser}
  \caption{This is a teaser}
  \label{fig:teaser}
\end{teaserfigure}
```

\settopmatter Some information in the top matter is printed for certain journals or proceedings and suppressed for others. You can override these defaults using the command \settopmatter{⟨*settings*⟩}. The settings and their meanings are listed in Table 5. For example,

```
\settopmatter{printacmref=false, printccs=true, printfolios=true}
```

The parameter authorsperrow requires some explanation. In conference proceedings authors' information is typeset in boxes, several boxes per row (see sample-sigconf.pdf, sample-sigplan.pdf, etc.). The number of boxes per row is determined automatically. If you want to override this, you can do it using this parameter, for example,

```
\settopmatter{authorsperrow=4}
```

However, in most cases you should *not* do this and should use the default settings. Setting authorsperrow to 0 will revert it to the default settings.

\received The command \received[⟨*stage*⟩]{⟨*date*⟩} sets the history of the publication. The [⟨*stage*⟩] argument is optional; the default is Received for the first date and revised for the subsequent ones. For example,

```
\received{February 2007}
\received[revised]{March 2009}
\received[accepted]{June 2009}
```

\maketitle The macro \maketitle must be the last command in the top-matter group. That is

it must follow the commands defined in this section.

\shortauthors *After* the command \maketitle, the macro \shortauthors stores the names of the authors for the running head. You can redefine it if the list of author's name is too long, e.g.,

```
\maketitle
\renewcommand{\shortauthors}{Zhou et al.}
```

2.4 Algorithms

There are now several good packages for typesetting algorithms [3, 4, 5], and the authors are free to choose their favorite one.

2.5 Figures and tables

The new ACM styles use the standard LaTeX interface for figures and tables. There are some important items to be aware of, however.

1. The captions for figures must be entered *after* the figure bodies and for tables *before* the table bodies.
2. The ACM uses the standard types for figures and tables and adds several new ones. In total there are the following types:

   figure, table: a standard figure or table taking a full text width in one-column formats and one column width in two-column formats.

   figure*, table* in two-column formats, a special figure or table taking a full text width.

   teaserfigure: a special figure before \maketitle.

   sidebar, marginfigure, margintable: in the sigchi-a format, special sidebars, tables and figures in the margin.
3. Accordingly, when scaling images, one should use the following sizes:
   (a) For teaserfigure, figure in one-column mode or figure* in two-column mode, use \textwidth. In one-column mode, you can also use \columnwidth, which coincides with \textwidth in this case.
   (b) For figure in two-column mode, use \columnwidth.
   (c) For marginfigure, use \marginparwidth.
   (d) For figure* in SIGCHI extended abstracts, use \fulltextwidth.

It is strongly recommended to use the package booktabs [6] and follow its main principles of typography with respect to tables:

1. Never, ever use vertical rules.
2. Never use double rules.

It is also a good idea not to overuse horizontal rules.

For table *footnotes* you have several options described in the TeX FAQ [1]. The simplest one is to use a `\minipage` environment:

```
\begin{table}
\caption{Simulation Configuration}
\label{tab:conf}
\begin{minipage}{\columnwidth}
\begin{center}
\begin{tabular}{ll}
  \toprule
  TERRAIN\footnote{This is a table footnote. This is a
    table footnote. This is a table footnote.} &
    (200\,m$\times$200\,m) Square\\
  Node Number     & 289\\
  Node Placement  & Uniform\\
  Application     & Many-to-Many/Gossip CBR Streams\\
  Payload Size    & 32 bytes\\
  Routing Layer   & GF\\
  MAC Layer       & CSMA/MMSN\\
  Radio Layer     & RADIO-ACCNOISE\\
  Radio Bandwidth & 250Kbps\\
  Radio Range     & 20m--45m\\
  \bottomrule
\end{tabular}
\end{center}
\bigskip
\footnotesize\emph{Source:} This is a table
 sourcenote. This is a table sourcenote. This is a table
 sourcenote.

 \emph{Note:} This is a table footnote.
\end{minipage}
\end{table}
```

`sidebar`
`marginfigure`
`margintable`

SIGCHI extended abstracts use margin space extensively. This package provides three environments for this with optional captions:

sidebar: textual information in the margin

marginfigure: a figure in the margin

margintable: a table in the margin

Tables and figures (including margin tables and margin figures) are by default centered. However, in some cases (for example, when you use several subimages per figure) you may need to override this. A good way to do so is to put the contents into a `\minipage` of the width `\columnwidth`.

2.6 Theorems

The ACM classes define two theorem styles and several pre-defined theorem environments:

acmplain: this is the style used for `theorem`, `conjecture`, `proposition`, `lemma` and `corollary`, and

acmdefinition: this is the style used for `example` and `definition`.

These environments are defined by default. In the unusual circumstance that a user does not wish to have these environments defined, the option `acmthm=false` in the preamble will suppress them.

2.7 Online-only and offline-only material

printonly
screenonly

Some supplementary material in ACM publications is put online but not in the printed version. The text inside the environment `screenonly` will be typeset only when the option `screen` (see Section 2.2) is set to `true`. Conversely, the text inside the environment `printonly` is typset only when this option is set to `false`. For example,

```
\section{Supplementary materials}

\begin{printonly}
  Supplementary materials are available in the online version of this paper.
\end{printonly}

\begin{screenonly}
  (The actual supplementary materials.)
\end{screenonly}
```

We use the `comment` package for typesetting this code, so `\begin` and `\end` should start on a line of their own with no leading or trailing spaces.

2.8 Note about anonymous mode

anonsuppress

When the option `anonymous` is selected, TEX suppresses author information (including the number of authors) for a blind review. However, sometimes the information identifying the authors may be present in the body of the paper. For example,

```
\begin{anonsuppress}
  This is the continuation of the previous work by the author
  \cite{prev1, prev2}.
\end{anonsuppress}
```

As for the `printonly` and `screenonly` environments, `\begin{anonsuppress}` and `\end{anonsuppress}` should start on a line of their own with no leading or trailing spaces.

2.9 Acknowledgments

The traditional "Acknowledgments" section is conventionally used to thank persons and granting agencies for their help and support. However, there are several important considerations about this section.

First, in anonymous mode this section must be omitted: it gives too much information to reviewers. Second, data about grants is extracted and stored separately by the postprocessing software. ACM classes provide facilities for both these tasks.

acks The environment `acks` starts an unnumbered section "Acknowledgments" unless the anonymous mode is chosen. Put all thanks inside this environment.

As for the `printonly` and `screenonly` environments, `\begin{acks}` and `\end{acks}` should start on a line of their own with no leading or trailing spaces.

\grantsponsor \grantnum All financial support *must* be listed using the commands `\grantsponsor` and `\grantnum`. These commands tell the postprocessing software about the granting organization and grant. The format of these commands is the following:

`\grantsponsor{`⟨*sponsorID*⟩`}{`⟨*name*⟩`}{`⟨*url*⟩`}`
`\grantnum[`⟨*url*⟩`]{`⟨*sponsorID*⟩`}{`⟨*number*⟩`}`.

Here `{`⟨*sponsorID*⟩`}` is the unique ID used to match grants to sponsors, `{`⟨*name*⟩`}` is the name of the sponsor, `{`⟨*url*⟩`}` is its URL, and `{`⟨*number*⟩`}` is the grant number. The `{`⟨*sponsorID*⟩`}` of the `\grantnum` command must correspond to the `{`⟨*sponsorID*⟩`}` of a `\grantsponsor` command. Some awards have their own web pages, which you can include using the optional argument of the `\grantnum` command.

At present `{`⟨*sponsorID*⟩`}` is chosen by the authors and can be an arbitrary key in the same way the label of a `\cite` is arbitrarily chosen. There might be a change to this policy if the ACM decides to create a global database of sponsoring organizations.

Example:

```
\begin{acks}
  The authors would like to thank Dr. Yuhua Li for providing the
  matlab code of the \textit{BEPS} method.

  The authors would also like to thank the anonymous referees for
  their valuable comments and helpful suggestions. This work is
  supported by the \grantsponsor{GS501100001809}{National Natural
  Science Foundation of
  China}{https://doi.org/10.13039/501100001809} under Grant
  No.:~\grantnum{GS501100001809}{61273304}
  and~\grantnum[http://www.nnsf.cn/youngscientists]{GS501100001809}{Young
  Scientists' Support Program}.
\end{acks}
```

2.10 Bibliography

The ACM uses the `natbib` package for formatting references and the BibTEX style file `ACM-Reference-Format.bst` for BibTEX processing. You can disable loading of `natbib` using the option `natbib=false` in `\documentclass`. However, it is not recommended,

as well as the use of BibTeX styles other than ACM-Reference-Format.bst, and may delay the processing of the manuscript.

\citestyle If you use natbib, you can select one of two predefined citation styles using the command \citestyle: the author-year format acmauthoryear or the numeric format acmnumeric. For example,

```
\citestyle{acmauthoryear}
```

Note that numeric citations are the default mode for most formats.

\setcitestyle You can further customize natbib using the \setcitestyle command, for example,

```
\setcitestyle{numbers,sort&compress}
```

One of the more common versions is

```
\setcitestyle{nosort}
```

It is useful if you do not like the way natbib sorts citation lists.

If you use natbib, then commands like \citep and \citeauthor are automatically supported. The command \shortcite is the same as \cite in numerical mode and cites the year in author-date mode.

Note that before version 1.48 the command \citeyear put the year in parentheses. In version 1.48 and later it produces just the year; the command \citeyearpar can be used to emulate its old behavior.

There are several customized BibTeX entry types and fields in the ACM style file ACM-Reference-Format.bst that you may want to be aware of.

The style supports the fields doi and url, for example,

```
doi =          "10.1145/1188913.1188915",
url =          "http://ccrma.stanford.edu/~jos/bayes/bayes.pdf",
```

The style supports the arXiv-recommended fields eprint and (optionally) primaryclass, for example,

```
eprint =       "960935712",
primaryclass = "cs",
```

See the examples at http://arxiv.org/hypertex/bibstyles/.

There are the special entry types online and game for Web pages and games, for example,

```
@online{Thornburg01,
 author =       "Harry Thornburg",
 year =         "2001",
 title =        "Introduction to Bayesian Statistics",
 url =          "http://ccrma.stanford.edu/~jos/bayes/bayes.html",
```

```
 month =        mar,
 lastaccessed = "March 2, 2005",
}
```

For these entry types you can use the `lastaccessed` field to add the access date for the URL.

There are two ways to enter video or audio sources in the bibliograpy corresponding to two different possibilies. For standalone sources available online, you can use an `online` entry and set its `howpublished` field. For example,

```
@online{Obama08,
 author =       "Barack Obama",
 year   =       "2008",
 title  =       "A more perfect union",
 howpublished = "Video",
 day    =       "5",
 url    =       "http://video.google.com/videoplay?docid=6528042696351994555",
 month  =       mar,
 lastaccessed = "March 21, 2008",
}
```

For sources available as attachments to conference proceedings and similar documents, you can use the usual `inproceedings` entry type and set its `howpublished` field:

```
@Inproceedings{Novak03,
 author =       "Dave Novak",
 title =        "Solder man",
 booktitle =    "ACM SIGGRAPH 2003 Video Review on Animation theater Program",
 year =         "2003",
 publisher =    "ACM Press",
 address =      "New York, NY",
 pages =        "4",
 month =        "March 21, 2008",
 doi =          "10.9999/woot07-S422",
 howpublished = "Video",
}
```

Sometimes you need to cite a complete issue of a journal. The `periodical` entry type is intended for this:

```
@periodical{JCohen96,
 key =          "Cohen",
 editor =       "Jacques Cohen",
 title =        "Special issue: Digital Libraries",
 journal =      "Communications of the {ACM}",
 volume =       "39",
 number =       "11",
 month =        nov,
```

```
 year =         "1996",
}
```

If you do not know the year of publication, the style will add "[n. d.]" (for "no date") to the entry.

If you do not know the author (this is often the case for online entries), use the `key` field to add a key for sorting and citations, for example,

```
@online{TUGInstmem,
 key =          {TUG},
 year  =        2017,
 title =        "Institutional members of the {\TeX} Users Group",
 url =          "http://wwtug.org/instmem.html",
 lastaccessed = "May 27, 2017",
}
```

2.11 Colors

While printed ACM publications are usually black and white, `screen` mode allows the use of colors. The ACM classes pre-define several colors according to [7]: `ACMBlue`, `ACMYellow`, `ACMOrange`, `ACMRed`, `ACMLightBlue`, `ACMGreen`, `ACMPurple` and `ACMDarkBlue`. You can use them in color assignments.

The ACM provides the following recommendation on color use.

The most accessible approach would be to ensure that your article is still readable when printed in greyscale. The most notable reasons for this are:

1. The most common type of inherited Color Vision Deficiency (CVD) is red-green (in which similar-brightness colors that differ only in their amounts of red or green are often confused), and it affects up to 8% of males and 0.5% of females of Northern European descent.

2. The most common type of acquired Color Vision Deficiency (CVD) is blue-yellow (including mild cases for many older adults).

3. Most printing is in black and white.

4. Situational impairments (e.g., bright sunlight shining on a mobile screen) tend to reduce the entire color gamut, reducing color discriminability.

Note: It is *not* safe to encode information using only variations in color (i.e., only differences in hue and/or saturation) as there is bound to be someone affected!

To ensure that you are using the most accessible colors, the ACM recommends that you choose sets of colors to help ensure suitable variations in when printed in greyscale by using either of the following tools:

1. ColourBrewer: http://colorbrewer2.org/

2. ACE: The Accessible Colour Evaluator: http://daprlab.com/ace/ for designing WCAG 2.0 compliant palettes.

2.12 Other notable packages and typographic remarks

Several other packages are recommended for specialized tasks.

The package `subcaption` [8] is recommended for complex figures with several subplots or subfigures that require separate subcaptioning. The packages `nomencl` [9] and `glossaries` [10] can be used for the automatic creation of the lists of symbols and concepts used.

By default `acmart` prevents all widows and orphans (i.e., lonely lines at the beginning or end of the page) and hyphenation at the end of the page. This is done by the rather strict settings

```
\widowpenalty=10000
\clubpenalty=10000
\brokenpenalty=10000
```

However, this may lead to frustrating results when the authors must obey a page limit. Setting these penalties to smaller values may help if you absolutely need to.

Another problem might be the too strict line breaking rules. Again, a strategically placed `\sloppy` command or putting the problematic paragraph inside `sloppypar` environment might help—but beware, the results might be, well, sloppy.

Note that the uppercasing in section titles is done using the `textcase` package [11], so the command `\NoCaseChange` inside the title may help to prevent extraneous uppercasing.

2.13 A note for wizards: `acmart-preload-hook.tex`

Sometimes you need to change the behavior of `acmart`. The usual way to do this is to redefine commands in the preamble. However, these definitions are executed *after* `acmart` is loaded and certain decisions are made. This presents a number of problems.

For example, one may want to use the `titletoc` package with `acmart`. This package should be loaded before `hyperref`. However, since `acmart` loads `hyperref` itself, the line `\usepackage{titletoc}` in the preamble will lead to grief (see http://tex.stackexchange.com/questions/357265/using-titletoc-with-acm-acmart-style).

Another example is passing options to a package. Suppose you want to use the `dvipsnames` option of the `xcolor` package. Normally you cannot do this because `acmart` loads this package itself without options.

The file `acmart-preload-hook.tex` can be used to solve these problems. If this file exists, it will be processed before any other package. You can use this file to load packages or pass options to them. For example, if you put in this file

```
\let\LoadClassOrig\LoadClass
\renewcommand\LoadClass[2][]{\LoadClassOrig[#1]{#2}%
\usepackage{titletoc}}
```

then `titletoc` will be loaded before `hyperref`. If you put in this file

```
\PassOptionsToPackage{dvipsnames}{xcolor}
```

you will pass `dvipsnames` to `xcolor`.

Important note. This hook makes it too easy to create a manuscript that is not acceptable by the ACM. It is even easier to create a file that cannot be compiled. So please do not use it *unless you know what you are doing.* And if you use it, *do not ask for support.* If you decide to use this hook, you are on your own.

3 Implementation

3.1 Identification

We start with a declaration of who we are. Most `.dtx` files put driver code in a separate `.drv` driver file. We roll this code into the main file and use the pseudo-guard `<gobble>` for it.

```
⟨class⟩\NeedsTeXFormat{LaTeX2e}
⟨*gobble⟩
\ProvidesFile{acmart.dtx}
⟨/gobble⟩
⟨class⟩\ProvidesClass{acmart}
[2018/02/07 v1.50 Typesetting articles for the Association for
Computing Machinery]
```

And the driver code:

```
⟨*gobble⟩
\documentclass{ltxdoc}
\usepackage{array,booktabs,amsmath,graphicx,fancyvrb,tabularx}
\usepackage[tt=false, type1=true]{libertine}
\usepackage[varqu]{zi4}
\usepackage[libertine]{newtxmath}
\usepackage[tableposition=top]{caption}
\usepackage{hypdoc}
\PageIndex
\CodelineIndex
\RecordChanges
\EnableCrossrefs
\begin{document}
  \DocInput{acmart.dtx}
\end{document}
⟨/gobble⟩
⟨*class⟩
\def\@classname{acmart}
```

3.2 Preload hook

We preload `acmart-preload-hook`:

```
\InputIfFileExists{acmart-preload-hook.tex}{%
  \ClassWarning{\@classname}{%
    I am loading acmart-preload-hook.tex. You are fully responsible
    for any problems from now on.}}{}
```

3.3 Options

We need `xkeyval` since some of our options may have values:

```
\RequirePackage{xkeyval}
```

We use `xstring` to check whether user input is integer

```
\RequirePackage{xstring}
```

`format` The possible formats

```
\define@choicekey*+{acmart.cls}{format}[\ACM@format\ACM@format@nr]{%
  manuscript, acmsmall, acmlarge, acmtog, sigconf, siggraph,
  sigplan, sigchi, sigchi-a}[manuscript]{}{%
  \ClassError{\@classname}{The option format must be manuscript,
    acmsmall, acmlarge, acmtog, sigconf, siggraph,
    sigplan, sigchi or sigchi-a}}
\def\@DeclareACMFormat#1{\DeclareOptionX{#1}{\setkeys{acmart.cls}{format=#1}}}
\@DeclareACMFormat{manuscript}
\@DeclareACMFormat{acmsmall}
\@DeclareACMFormat{acmlarge}
\@DeclareACMFormat{acmtog}
\@DeclareACMFormat{sigconf}
\@DeclareACMFormat{siggraph}
\@DeclareACMFormat{sigplan}
\@DeclareACMFormat{sigchi}
\@DeclareACMFormat{sigchi-a}
\ExecuteOptionsX{format}
```

`\if@ACM@screen` Whether we use screen mode

```
\define@boolkey+{acmart.cls}[@ACM@]{screen}[true]{%
  \if@ACM@screen
    \PackageInfo{\@classname}{Using screen mode}%
  \else
    \PackageInfo{\@classname}{Not using screen mode}%
  \fi}{\PackageError{\@classname}{The option screen can be either true or
    false}}
\ExecuteOptionsX{screen=false}
```

`\if@ACM@acmthm` Whether we define theorem-like environments.

```
\define@boolkey+{acmart.cls}[@ACM@]{acmthm}[true]{%
  \if@ACM@acmthm
    \PackageInfo{\@classname}{Requiring acmthm}%
  \else
    \PackageInfo{\@classname}{Suppressing acmthm}%
  \fi}{\PackageError{\@classname}{The option acmthm can be either true or
    false}}
\ExecuteOptionsX{acmthm=true}
```

`\if@ACM@review` Whether we use review mode

```
\define@boolkey+{acmart.cls}[@ACM@]{review}[true]{%
  \if@ACM@review
    \PackageInfo{\@classname}{Using review mode}%
    \AtBeginDocument{\@ACM@printfoliostrue}%
  \else
    \PackageInfo{\@classname}{Not using review mode}%
  \fi}{\PackageError{\@classname}{The option review can be either true or
    false}}
\ExecuteOptionsX{review=false}
```

\if@ACM@authorversion Whether we use author's-version mode

```
\define@boolkey+{acmart.cls}[@ACM@]{authorversion}[true]{%
  \if@ACM@authorversion
    \PackageInfo{\@classname}{Using authorversion mode}%
  \else
    \PackageInfo{\@classname}{Not using authorversion mode}%
 \fi}{\PackageError{\@classname}{The option authorversion can be either true or
    false}}
\ExecuteOptionsX{authorversion=false}
```

\if@ACM@natbib@override This macro is no longer used.

\if@ACM@natbib Whether we use natbib mode

```
\define@boolkey+{acmart.cls}[@ACM@]{natbib}[true]{%
  \if@ACM@natbib
    \PackageInfo{\@classname}{Explicitly selecting natbib mode}%
  \else
    \PackageInfo{\@classname}{Explicitly deselecting natbib mode}%
  \fi}{\PackageError{\@classname}{The option natbib can be either true or
    false}}
\ExecuteOptionsX{natbib=true}
```

\if@ACM@anonymous Whether we use anonymous mode

```
\define@boolkey+{acmart.cls}[@ACM@]{anonymous}[true]{%
  \if@ACM@anonymous
    \PackageInfo{\@classname}{Using anonymous mode}%
  \else
    \PackageInfo{\@classname}{Not using anonymous mode}%
  \fi}{\PackageError{\@classname}{The option anonymous can be either true or
    false}}
\ExecuteOptionsX{anonymous=false}
```

\if@ACM@timestamp Whether we use timestamp mode

```
\define@boolkey+{acmart.cls}[@ACM@]{timestamp}[true]{%
  \if@ACM@timestamp
    \PackageInfo{\@classname}{Using timestamp mode}%
  \else
    \PackageInfo{\@classname}{Not using timestamp mode}%
  \fi}{\PackageError{\@classname}{The option timestamp can be either true or
    false}}
\ExecuteOptionsX{timestamp=false}
```

\if@ACM@authordraft Whether we use author-draft mode

```
\define@boolkey+{acmart.cls}[@ACM@]{authordraft}[true]{%
  \if@ACM@authordraft
    \PackageInfo{\@classname}{Using authordraft mode}%
    \@ACM@timestamptrue
    \@ACM@reviewtrue
  \else
```

```
    \PackageInfo{\@classname}{Not using authordraft mode}%
  \fi}{\PackageError{\@classname}{The option authordraft can be either true or
    false}}
\ExecuteOptionsX{authordraft=false}
```

`\ACM@fontsize` The font size to pass to the base class

```
\def\ACM@fontsize{}
\DeclareOptionX{9pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{10pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{11pt}{\edef\ACM@fontsize{\CurrentOption}}
\DeclareOptionX{12pt}{\edef\ACM@fontsize{\CurrentOption}}

\DeclareOptionX{draft}{\PassOptionsToClass{\CurrentOption}{amsart}}
\DeclareOptionX{*}{\PassOptionsToClass{\CurrentOption}{amsart}}
\ProcessOptionsX
\ClassInfo{\@classname}{Using format \ACM@format, number \ACM@format@nr}
```

3.4 Setting switches

`\if@ACM@manuscript` Whether we use manuscript mode

```
\newif\if@ACM@manuscript
```

`\if@ACM@journal` There are two kinds of publications: journals and books

```
\newif\if@ACM@journal
```

`\if@ACM@sigchiamode` The formatting of SIGCHI extended abstracts is quite unusual. We have a special switch for them.

```
\newif\if@ACM@sigchiamode
```

Setting up switches

```
\ifnum\ACM@format@nr=5\relax % siggraph
  \ClassWarning{\@classname}{The format siggraph is now obsolete.
    I am switching to sigconf.}
  \setkeys{acmart.cls}{format=sigconf}
\fi
\ifnum\ACM@format@nr=0\relax
  \@ACM@manuscripttrue
\else
  \@ACM@manuscriptfalse
\fi
\@ACM@sigchiamodefalse
\ifcase\ACM@format@nr
\relax % manuscript
  \@ACM@journaltrue
\or % acmsmall
  \@ACM@journaltrue
\or % acmlarge
  \@ACM@journaltrue
```

```
\or % acmtog
  \@ACM@journaltrue
\or % sigconf
  \@ACM@journalfalse
\or % siggraph
  \@ACM@journalfalse
 \or % sigplan
  \@ACM@journalfalse
 \or % sigchi
  \@ACM@journalfalse
\or % sigchi-a
  \@ACM@journalfalse
  \@ACM@sigchiamodetrue
\fi
```

3.5 Loading the base class and package

At this point we either have `\ACM@fontsize` or use defaults

```
\ifx\ACM@fontsize\@empty
  \ifcase\ACM@format@nr
  \relax % manuscript
    \def\ACM@fontsize{9pt}%
  \or % acmsmall
    \def\ACM@fontsize{10pt}%
  \or % acmlarge
    \def\ACM@fontsize{10pt}%
  \or % acmtog
    \def\ACM@fontsize{9pt}%
  \or % sigconf
    \def\ACM@fontsize{9pt}%
  \or % siggraph
    \def\ACM@fontsize{9pt}%
   \or % sigplan
    \def\ACM@fontsize{10pt}%
   \or % sigchi
    \def\ACM@fontsize{10pt}%
  \or % sigchi-a
    \def\ACM@fontsize{10pt}%
  \fi
\fi
\ClassInfo{\@classname}{Using fontsize \ACM@fontsize}
\LoadClass[\ACM@fontsize, reqno]{amsart}
\RequirePackage{microtype}
```

We need `etoolbox` for delayed code

```
\RequirePackage{etoolbox}
```

We need `totpages` to calculate the number of pages and `refcount` to use that number

```
\RequirePackage{refcount}
```

```
\RequirePackage{totpages}
```

The `\collect@body` macro in `amsmath` is defined using `\def`. We load `environ` to access the `\long` version of this command

```
\RequirePackage{environ}
```

We use `setspace` for double spacing

```
\if@ACM@manuscript
\RequirePackage{setspace}
\onehalfspacing
\fi
```

We need `textcase` for better upcasing

```
\RequirePackage{textcase}
```

3.6 Citations

We patch `\setcitestyle` to allow, for example, `\setcitestyle{sort}` and `\setcitestyle{nosort}`. We patch `\citestyle` to warn about undefined citation styles.

```
\if@ACM@natbib
  \RequirePackage{natbib}
  \renewcommand{\bibsection}{%
     \section*{\refname}%
     \phantomsection\addcontentsline{toc}{section}{\refname}%
  }
  \renewcommand{\bibfont}{\bibliofont}
  \renewcommand\setcitestyle[1]{
  \@for\@tempa:=#1\do
  {\def\@tempb{round}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{(}\renewcommand\NAT@close{)}\fi
   \def\@tempb{square}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{[}\renewcommand\NAT@close{]}\fi
   \def\@tempb{angle}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{$<$}\renewcommand\NAT@close{$>$}\fi
   \def\@tempb{curly}\ifx\@tempa\@tempb
     \renewcommand\NAT@open{\{}\renewcommand\NAT@close{\}}\fi
   \def\@tempb{semicolon}\ifx\@tempa\@tempb
     \renewcommand\NAT@sep{;}\fi
   \def\@tempb{colon}\ifx\@tempa\@tempb
     \renewcommand\NAT@sep{;}\fi
   \def\@tempb{comma}\ifx\@tempa\@tempb
     \renewcommand\NAT@sep{,}\fi
   \def\@tempb{authoryear}\ifx\@tempa\@tempb
     \NAT@numbersfalse\fi
   \def\@tempb{numbers}\ifx\@tempa\@tempb
     \NAT@numberstrue\NAT@superfalse\fi
   \def\@tempb{super}\ifx\@tempa\@tempb
     \NAT@numberstrue\NAT@supertrue\fi
   \def\@tempb{nobibstyle}\ifx\@tempa\@tempb
     \let\bibstyle=\@gobble\fi
```

```
  \def\@tempb{bibstyle}\ifx\@tempa\@tempb
    \let\bibstyle=\@citestyle\fi
  \def\@tempb{sort}\ifx\@tempa\@tempb
    \def\NAT@sort{\@ne}\fi
  \def\@tempb{nosort}\ifx\@tempa\@tempb
    \def\NAT@sort{\z@}\fi
  \def\@tempb{compress}\ifx\@tempa\@tempb
    \def\NAT@cmprs{\@ne}\fi
  \def\@tempb{nocompress}\ifx\@tempa\@tempb
    \def\NAT@cmprs{\@z}\fi
  \def\@tempb{sort&compress}\ifx\@tempa\@tempb
    \def\NAT@sort{\@ne}\def\NAT@cmprs{\@ne}\fi
  \def\@tempb{mcite}\ifx\@tempa\@tempb
    \let\NAT@merge\@ne\fi
  \def\@tempb{merge}\ifx\@tempa\@tempb
    \@ifnum{\NAT@merge<\tw@}{\let\NAT@merge\tw@}{}\fi
  \def\@tempb{elide}\ifx\@tempa\@tempb
    \@ifnum{\NAT@merge<\thr@@}{\let\NAT@merge\thr@@}{}\fi
  \def\@tempb{longnamesfirst}\ifx\@tempa\@tempb
    \NAT@longnamestrue\fi
  \def\@tempb{nonamebreak}\ifx\@tempa\@tempb
    \def\NAT@nmfmt#1{\mbox{\NAT@up#1}}\fi
  \expandafter\NAT@find@eq\@tempa=\relax\@nil
  \if\@tempc\relax\else
    \expandafter\NAT@rem@eq\@tempc
    \def\@tempb{open}\ifx\@tempa\@tempb
     \xdef\NAT@open{\@tempc}\fi
    \def\@tempb{close}\ifx\@tempa\@tempb
     \xdef\NAT@close{\@tempc}\fi
    \def\@tempb{aysep}\ifx\@tempa\@tempb
     \xdef\NAT@aysep{\@tempc}\fi
    \def\@tempb{yysep}\ifx\@tempa\@tempb
     \xdef\NAT@yrsep{\@tempc}\fi
    \def\@tempb{notesep}\ifx\@tempa\@tempb
     \xdef\NAT@cmt{\@tempc}\fi
    \def\@tempb{citesep}\ifx\@tempa\@tempb
     \xdef\NAT@sep{\@tempc}\fi
  \fi
 }%
 \NAT@@setcites
 }
 \renewcommand\citestyle[1]{%
   \ifcsname bibstyle@#1\endcsname%
   \csname bibstyle@#1\endcsname\let\bibstyle\@gobble%
   \else%
   \@latex@error{Undefined `#1' citestyle}%
   \fi
 }%
\fi
```

\bibstyle@acmauthoryear The default author-year format:

```
\newcommand{\bibstyle@acmauthoryear}{%
  \setcitestyle{%
    authoryear,%
    open={[},close={]},citesep={;},%
    aysep={},yysep={,},%
    notesep={, }}}
```

\bibstyle@acmnumeric The default numeric format:

```
\newcommand{\bibstyle@acmnumeric}{%
  \setcitestyle{%
    numbers,sort&compress,%
    open={[},close={]},citesep={,},%
    notesep={, }}}
```

The default is numeric:

```
\if@ACM@natbib
\citestyle{acmnumeric}
\fi
```

\@startsection Before we call hyperref, we redefine \startsection commands to their LaTeX defaults since the amsart ones are too AMS-specific. We need to do this early since we want hyperref to have a chance to redefine them again:

```
\def\@startsection#1#2#3#4#5#6{%
  \if@noskipsec \leavevmode \fi
  \par
  \@tempskipa #4\relax
  \@afterindenttrue
  \ifdim \@tempskipa <\z@
    \@tempskipa -\@tempskipa \@afterindentfalse
  \fi
  \if@nobreak
    \everypar{}%
  \else
    \addpenalty\@secpenalty\addvspace\@tempskipa
  \fi
  \@ifstar
    {\@ssect{#3}{#4}{#5}{#6}}%
    {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}}
\def\@sect#1#2#3#4#5#6[#7]#8{%
  \edef\@toclevel{\ifnum#2=\@m 0\else\number#2\fi}%
  \ifnum #2>\c@secnumdepth
    \let\@svsec\@empty
  \else
    \refstepcounter{#1}%
    \protected@edef\@svsec{\@seccntformat{#1}\relax}%
  \fi
  \@tempskipa #5\relax
  \ifdim \@tempskipa>\z@
```

```
    \begingroup
      #6{%
        \@hangfrom{\hskip #3\relax\@svsec}%
          \interlinepenalty \@M #8\@@par}%
    \endgroup
    \csname #1mark\endcsname{#7}%
    \ifnum #2>\c@secnumdepth \else
        \@tochangmeasure{\csname the#1\endcsname}%
    \fi
    \addcontentsline{toc}{#1}{%
      \ifnum #2>\c@secnumdepth \else
        \protect\numberline{\csname the#1\endcsname}%
      \fi
      #7}%
  \else
    \def\@svsechd{%
      #6{\hskip #3\relax
      \@svsec #8}%
      \csname #1mark\endcsname{#7}%
      \ifnum #2>\c@secnumdepth \else
        \@tochangmeasure{\csname the#1\endcsname\space}%
      \fi
      \addcontentsline{toc}{#1}{%
        \ifnum #2>\c@secnumdepth \else
          \protect\numberline{\csname the#1\endcsname}%
        \fi
        #7}}%
  \fi
  \@xsect{#5}}
\def\@xsect#1{%
  \@tempskipa #1\relax
  \ifdim \@tempskipa>\z@
    \par \nobreak
    \vskip \@tempskipa
    \@afterheading
  \else
    \@nobreakfalse
    \global\@noskipsectrue
    \everypar{%
      \if@noskipsec
        \global\@noskipsecfalse
       {\setbox\z@\lastbox}%
        \clubpenalty\@M
        \begingroup \@svsechd \endgroup
        \unskip
        \@tempskipa #1\relax
        \hskip -\@tempskipa
      \else
        \clubpenalty \@clubpenalty
        \everypar{}%
```

```
      \fi}%
  \fi
  \ignorespaces}
\def\@seccntformat#1{\csname the#1\endcsname\quad}
\def\@ssect#1#2#3#4#5{%
  \@tempskipa #3\relax
  \ifdim \@tempskipa>\z@
    \begingroup
      #4{%
        \@hangfrom{\hskip #1}%
          \interlinepenalty \@M #5\@@par}%
    \endgroup
  \else
    \def\@svsechd{#4{\hskip #1\relax #5}}%
  \fi
  \@xsect{#3}}
```

`\@startsection` The amsart package redefines `\startsection`. Here we redefine it again to make the table of contents work.

```
\def\@starttoc#1#2{\begingroup\makeatletter
  \setTrue{#1}%
  \par\removelastskip\vskip\z@skip
  \@startsection{section}\@M\z@{\linespacing\@plus\linespacing}%
    {.5\linespacing}{\centering\contentsnamefont}{#2}%
  \@input{\jobname.#1}%
  \if@filesw
    \@xp\newwrite\csname tf@#1\endcsname
    \immediate\@xp\openout\csname tf@#1\endcsname \jobname.#1\relax
  \fi
  \global\@nobreakfalse \endgroup
  \addvspace{32\p@\@plus14\p@}%
}
```

`\l@subsection` Section spacing is more generous than for amsart

```
\def\l@section{\@tocline{1}{0pt}{1pc}{2pc}{}}
```

`\l@subsection` The spacing in amsart is too large

```
\def\l@subsection{\@tocline{2}{0pt}{1pc}{3pc}{}}
```

`\l@subsubsection` The spacing in amsart is too large

```
\def\l@subsubsection{\@tocline{2}{0pt}{1pc}{5pc}{}}
```

And hyperref

```
\let\@footnotemark@nolink\@footnotemark
\let\@footnotetext@nolink\@footnotetext
\RequirePackage[bookmarksnumbered,unicode]{hyperref}
\pdfstringdefDisableCommands{%
  \def\unskip{}%
  \def\textbullet{- }%
```

```
  \def\textrightarrow{ -> }%
  \def\footnotemark{}%
}
\urlstyle{rm}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \urlstyle{sf}
\or % sigchi
\or % sigchi-a
  \urlstyle{sf}
\fi
\AtEndPreamble{%
  \if@ACM@screen
    \hypersetup{colorlinks,
      linkcolor=ACMRed,
      citecolor=ACMPurple,
      urlcolor=ACMDarkBlue,
      filecolor=ACMDarkBlue}
    \else
    \hypersetup{hidelinks}
  \fi}
```

Bibliography mangling.

```
\if@ACM@natbib
  \let\citeN\cite
  \let\cite\citep
  \let\citeANP\citeauthor
  \let\citeNN\citeyearpar
  \let\citeyearNP\citeyear
  \let\citeNP\citealt
  \DeclareRobustCommand\citeA
     {\begingroup\NAT@swafalse
       \let\NAT@ctype\@ne\NAT@partrue\NAT@fullfalse\NAT@open\NAT@citetp}%
  \providecommand\newblock{}%
\else
  \AtBeginDocument{%
    \let\shortcite\cite%
    \providecommand\citename[1]{#1}}
\fi
\newcommand\shortcite[2][]{%
  \ifNAT@numbers\cite[#1]{#2}\else\citeyearpar[#1]{#2}\fi}
```

`\bibliographystyle` The `amsart` package redefines `\bibliographystyle` since it prefers the AMS bibliography style. We turn it back to the LaTeX definition:

```
\def\bibliographystyle#1{%
  \ifx\@begindocumenthook\@undefined\else
    \expandafter\AtBeginDocument
  \fi
    {\if@filesw
       \immediate\write\@auxout{\string\bibstyle{#1}}%
     \fi}}
```

Graphics and color.

```
\RequirePackage{graphicx}
\RequirePackage[prologue]{xcolor}
```

We define ACM colors according to [7]:

```
\definecolor[named]{ACMBlue}{cmyk}{1,0.1,0,0.1}
\definecolor[named]{ACMYellow}{cmyk}{0,0.16,1,0}
\definecolor[named]{ACMOrange}{cmyk}{0,0.42,1,0.01}
\definecolor[named]{ACMRed}{cmyk}{0,0.90,0.86,0}
\definecolor[named]{ACMLightBlue}{cmyk}{0.49,0.01,0,0}
\definecolor[named]{ACMGreen}{cmyk}{0.20,0,1,0.19}
\definecolor[named]{ACMPurple}{cmyk}{0.55,1,0,0.15}
\definecolor[named]{ACMDarkBlue}{cmyk}{1,0.58,0,0.21}
```

Author-draft mode

```
\if@ACM@authordraft
  \RequirePackage{draftwatermark}
  \SetWatermarkFontSize{0.5in}
  \SetWatermarkColor[gray]{.9}
  \SetWatermarkText{\parbox{12em}{\centering
      Unpublished working draft.\\
      Not for distribution.}}
\fi
```

3.7 Paper size and paragraphing

We use `geometry` for dimensions. Note that the present margins do not depend on the font size option—we might need to change this. See https://github.com/borisveytsman/acmart/issues/5#issuecomment-272881329.

```
\RequirePackage{geometry}
\ifcase\ACM@format@nr
\relax % manuscript
   \geometry{letterpaper,head=13pt,
   marginparwidth=6pc,heightrounded}%
\or % acmsmall
   \geometry{twoside=true,
     includeheadfoot, head=13pt, foot=2pc,
     paperwidth=6.75in, paperheight=10in,
     top=58pt, bottom=44pt, inner=46pt, outer=46pt,
     marginparwidth=2pc,heightrounded
   }%
\or % acmlarge
```

```
   \geometry{twoside=true, head=13pt, foot=2pc,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot,
     top=78pt, bottom=114pt, inner=81pt, outer=81pt,
     marginparwidth=4pc,heightrounded
     }%
\or % acmtog
   \geometry{twoside=true, head=13pt, foot=2pc,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot, columnsep=24pt,
     top=52pt, bottom=75pt, inner=52pt, outer=52pt,
     marginparwidth=2pc,heightrounded
     }%
\or % sigconf
   \geometry{twoside=true, head=13pt,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot, columnsep=2pc,
     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
     marginparwidth=2pc,heightrounded
     }%
\or % siggraph
   \geometry{twoside=true, head=13pt,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot, columnsep=2pc,
     top=57pt, bottom=73pt, inner=54pt, outer=54pt,
     marginparwidth=2pc,heightrounded
     }%
\or % sigplan
   \geometry{twoside=true, head=13pt,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot=false, columnsep=2pc,
     top=1in, bottom=1in, inner=0.75in, outer=0.75in,
     marginparwidth=2pc,heightrounded
     }%
\or % sigchi
   \geometry{twoside=true, head=13pt,
     paperwidth=8.5in, paperheight=11in,
     includeheadfoot, columnsep=2pc,
     top=66pt, bottom=73pt, inner=54pt, outer=54pt,
     marginparwidth=2pc,heightrounded
     }%
\or % sigchi-a
   \geometry{twoside=false, head=13pt,
     paperwidth=11in, paperheight=8.5in,
     includeheadfoot, marginparsep=72pt,
     marginparwidth=170pt, columnsep=20pt,
     top=72pt, bottom=72pt, left=314pt, right=72pt
     }%
     \@mparswitchfalse
     \reversemarginpar
```

```
\fi
```

\parindent
\parskip

Paragraphing

```
\setlength\parindent{10\p@}
\setlength\parskip{\z@}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
  \setlength\parindent{9\p@}%
\or % sigconf
\or % siggraph
\or % sigplan
\or % sigchi
\or % sigchi-a
\fi
```

\normalparindent

The amsart package defines the \normalparindent length and initializes it to 12pt (the value of \parindent in amsart). It is later used to set the \listparindent length in the quotation environment and the \parindent length in the \@footnotetext command. We set \normalparindent to the value of \parindent as selected by acmart for consistent paragraph indents.

```
\setlength\normalparindent{\parindent}
```

Footnotes require some consideration. We have several layers of footnotes: frontmatter footnotes, "regular" footnotes and the special insert for the bibstrip. In the old ACM classes, the bibstrip was a \@float. The problem with floats is that they tend to, well, float—and we want the guarantee they stay.

We use manyfoot for layered footnotes instead.

\copyrightpermissionfootnoterule

This is the footnote rule that separates the bibstrip from the rest of the paper. It is a full width rule.

```
\def\copyrightpermissionfootnoterule{\kern-3\p@
  \hrule \@width \columnwidth \kern 2.6\p@}

\RequirePackage{manyfoot}
\SelectFootnoteRule[2]{copyrightpermission}
\DeclareNewFootnote{authorsaddresses}
\SelectFootnoteRule[2]{copyrightpermission}
\DeclareNewFootnote{copyrightpermission}
```

\footnoterule

Tschichold's rules:

```
\def\footnoterule{\kern-3\p@
  \hrule \@width 4pc \kern 2.6\p@}
```

\endminipage

We do not use footnote rules in minipages

```
\def\endminipage{%
    \par
```

```
    \unskip
    \ifvoid\@mpfootins\else
      \vskip\skip\@mpfootins
      \normalcolor
      \unvbox\@mpfootins
    \fi
    \@minipagefalse
  \color@endgroup
  \egroup
  \expandafter\@iiiparbox\@mpargs{\unvbox\@tempboxa}}
```

`\@makefntext` We do not use indentation for footnotes

```
\def\@makefntext{\noindent\@makefnmark}
```

`\@footnotetext` In `sigchi-a` mode our footnotes are in the margin!

```
\if@ACM@sigchiamode
\long\def\@footnotetext#1{\marginpar{%
    \reset@font\small
    \interlinepenalty\interfootnotelinepenalty
    \protected@edef\@currentlabel{%
       \csname p@footnote\endcsname\@thefnmark
    }%
    \color@begingroup
      \@makefntext{%
        \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
    \color@endgroup}}%
\fi
```

`\@mpfootnotetext` We want the footnotes in minipages centered:

```
\long\def\@mpfootnotetext#1{%
  \global\setbox\@mpfootins\vbox{%
    \unvbox\@mpfootins
    \reset@font\footnotesize
    \hsize\columnwidth
    \@parboxrestore
    \protected@edef\@currentlabel
         {\csname p@mpfootnote\endcsname\@thefnmark}%
    \color@begingroup\centering
      \@makefntext{%
        \rule\z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
    \color@endgroup}}
```

`\@makefnmark` AMS classes use a buggy definition of `\makefnmark`. We revert to the standard one.

```
\def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}
```

`\@textbottom` Add some stretch according to David Carlisle's advice at http://tex.stackexchange.com/a/62318/5522

```
\def\@textbottom{\vskip \z@ \@plus 1pt}
\let\@texttop\relax
```

3.8 Fonts

Somehow PDFTeX and XeTeX require different incantations to make a PDF compliant with the current Acrobat bugs. Xpdf is much better.

The code below is by Ross Moore.

```
\RequirePackage{iftex}
\ifPDFTeX
\input{glyphtounicode}
\pdfglyphtounicode{f_f}{FB00}
\pdfglyphtounicode{f_f_i}{FB03}
\pdfglyphtounicode{f_f_l}{FB04}
\pdfglyphtounicode{f_i}{FB01}
\pdfglyphtounicode{t_t}{00740074}
\pdfglyphtounicode{f_t}{00660074}
\pdfglyphtounicode{T_h}{00540068}
\pdfgentounicode=1
\fi
\RequirePackage{cmap}
```

`\if@ACM@newfonts` Whether we load the new fonts

```
\newif\if@ACM@newfonts
\@ACM@newfontstrue
\IfFileExists{libertine.sty}{}{\ClassWarning{\@classname}{You do not
    have the libertine package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
\IfFileExists{zi4.sty}{}{\ClassWarning{\@classname}{You do not
    have the zi4 package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
\IfFileExists{newtxmath.sty}{}{\ClassWarning{\@classname}{You do not
    have the newtxmath package installed.  Please upgrade your
    TeX}\@ACM@newfontsfalse}
```

We use Libertine throughout.

```
\if@ACM@newfonts
\RequirePackage[tt=false, type1=true]{libertine}
\RequirePackage[varqu]{zi4}
\RequirePackage[libertine]{newtxmath}
\RequirePackage[T1]{fontenc}
\fi
```

`\liningnums` Libertine defines `\liningnums`, which makes `fontspec` unhappy. While we do not use `fontspec`, some users do.

```
\let\liningnums\@undefined
\AtEndPreamble{%
  \DeclareTextFontCommand{\liningnums}{\libertineLF}}
```

The SIGCHI extended abstracts are sans serif:

```
\if@ACM@sigchiamode
  \renewcommand{\familydefault}{\sfdefault}
\fi
```

3.9 Floats

We use the caption package

```
\RequirePackage{caption, float}
\captionsetup[table]{position=top}
\if@ACM@journal
  \captionsetup{labelfont={sf, small},
    textfont={sf, small}, margin=\z@}
  \captionsetup[figure]{name={Fig.}}
\else
  \captionsetup{labelfont={bf},
    textfont={bf}, labelsep=colon, margin=\z@}
  \ifcase\ACM@format@nr
  \relax % manuscript
  \or % acmsmall
  \or % acmlarge
  \or % acmtog
  \or % sigconf
  \or % siggraph
    \captionsetup{textfont={it}}
  \or % sigplan
    \captionsetup{labelfont={bf},
      textfont={normalfont}, labelsep=period, margin=\z@}
  \or % sigchi
    \captionsetup[figure]{labelfont={bf, small},
      textfont={bf, small}}
  \or % sigchi-a
    \captionsetup[figure]{labelfont={bf, small},
      textfont={bf, small}}
  \fi
\fi
```

sidebar The sidebar environment:

```
\newfloat{sidebar}{}{sbar}
\floatname{sidebar}{Sidebar}
\renewenvironment{sidebar}{\Collect@Body\@sidebar}{}
```

\@sidebar The processing of the saved text

```
\long\def\@sidebar#1{\bgroup\captionsetup{type=sidebar}%
  \marginpar{\small#1}\egroup}
```

marginfigure The marginfigure environment:

```
\newenvironment{marginfigure}{\Collect@Body\@marginfigure}{}
```

\@marginfigure The processing of the saved text

```
\long\def\@marginfigure#1{\bgroup\captionsetup{type=figure}%
  \marginpar{\centering\small#1}\egroup}
```

margintable The margintable environment:

```
\newenvironment{margintable}{\Collect@Body\@margintable}{}
```

\@margintable The processing of the saved text

```
\long\def\@margintable#1{\bgroup\captionsetup{type=table}%
  \marginpar{\centering\small#1}\egroup}
```

SIGCHI extended abstracts provide an interesting possibility to push into the margin. Here we use `figure*` and `table*` for this.

\fulltextwidth We define the width of the boxes as

```
\newdimen\fulltextwidth
\fulltextwidth=\dimexpr(\textwidth+\marginparwidth+\marginparsep)
```

\@dblfloat We redefine the double-float command. First, we make the size bigger. Second, our default position is going to be `tp` (to give marginalia a chance)

```
\if@ACM@sigchiamode
\def\@dblfloat{\bgroup\columnwidth=\fulltextwidth
  \let\@endfloatbox\@endwidefloatbox
  \def\@fpsadddefault{\def\@fps{tp}}%
  \@float}
\fi
```

\end@dblfloat And the end. Just adding a `\bgroup`.

```
\if@ACM@sigchiamode
\def\end@dblfloat{%
    \end@float\egroup}
\fi
```

\@endwidefloatbox This is the end of a wide box—we basically move everything to the left

```
\def\@endwidefloatbox{%
  \par\vskip\z@skip
  \@minipagefalse
  \outer@nobreak
  \egroup
  \color@endbox
  \global\setbox\@currbox=\vbox{\moveleft
    \dimexpr(\fulltextwidth-\textwidth)\box\@currbox}%
  \wd\@currbox=\textwidth
}
```

3.10 Lists

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
\def\labelenumi{\theenumi.}
```

```
\def\labelenumii{\theenumii.}
\def\labelenumiii{\theenumiii.}
\def\labelenumiv{\theenumiv.}
\or % sigchi
\or % sigchi-a
\fi
```

The AMS uses generous margins for lists. Note that amsart defines \leftmargin values for list levels at the beginning of the document, so we must redefine them in the same manner. Also, note that amsart redefines the enumerate and itemize environments with a \makelabel command that uses \llap, so the \labelwidth value is (effectively) irrelevant; nonetheless, we follow amsart and set \labelwidth to \leftmargin minus \labelsep.

```
\newdimen\@ACM@labelwidth
\AtBeginDocument{%
  \setlength\labelsep{4pt}
  \setlength{\@ACM@labelwidth}{6.5pt}

  %% First-level list: when beginning after the first line of an
  %% indented paragraph or ending before an indented paragraph, labels
  %% should not hang to the left of the preceding/following text.
  \setlength\leftmargini{\z@}
  \addtolength\leftmargini{\parindent}
  \addtolength\leftmargini{2\labelsep}
  \addtolength\leftmargini{\@ACM@labelwidth}

  %% Second-level and higher lists.
  \setlength\leftmarginii{\z@}
  \addtolength\leftmarginii{0.5\labelsep}
  \addtolength\leftmarginii{\@ACM@labelwidth}
  \setlength\leftmarginiii{\leftmarginii}
  \setlength\leftmarginiv{\leftmarginiii}
  \setlength\leftmarginv{\leftmarginiv}
  \setlength\leftmarginvi{\leftmarginv}
  \@listi}
\newskip\listisep
\listisep\smallskipamount
\def\@listI{\leftmargin\leftmargini
  \labelwidth\leftmargini \advance\labelwidth-\labelsep
  \listparindent\z@
  \topsep\listisep}
\let\@listi\@listI
\def\@listii{\leftmargin\leftmarginii
  \labelwidth\leftmarginii \advance\labelwidth-\labelsep
  \topsep\z@skip}
\def\@listiii{\leftmargin\leftmarginiii
  \labelwidth\leftmarginiii \advance\labelwidth-\labelsep}
\def\@listiv{\leftmargin\leftmarginiv
  \labelwidth\leftmarginiv \advance\labelwidth-\labelsep}
\def\@listv{\leftmargin\leftmarginv
```

```
  \labelwidth\leftmarginv \advance\labelwidth-\labelsep}
\def\@listvi{\leftmargin\leftmarginvi
  \labelwidth\leftmarginvi \advance\labelwidth-\labelsep}
```

\descriptionlabel We do not use a colon by default like amsart does:

```
\renewcommand{\descriptionlabel}[1]{\upshape\bfseries #1}
```

\description Make the description environment indentation consistent with that of the itemize and enumerate environments.

```
\renewenvironment{description}{\list{}{%
    \labelwidth\@ACM@labelwidth
    \let\makelabel\descriptionlabel}%
}{
  \endlist
}
\let\enddescription=\endlist % for efficiency
```

3.11 Top-matter data

We use the xkeyval interface to define journal titles and the relevant information

```
\define@choicekey*+{ACM}{acmJournal}[\@journalCode\@journalCode@nr]{%
  CIE,%
  CSUR,%
  DTRAP,%
  IMWUT,%
  JACM,%
  JDIQ,%
  JEA,%
  JERIC,%
  JETC,%
  JOCCH,%
  PACMHCI,%
  PACMPL,%
  POMACS,%
  TAAS,%
  TACCESS,%
  TACO,%
  TALG,%
  TALLIP,%
  TAP,%
  TCPS,%
  TEAC,%
  TECS,%
  THRI,%
  TIIS,%
  TISSEC,%
  TIST,%
  TKDD,%
  TMIS,%
```

```
  TOCE,%
  TOCHI,%
  TOCL,%
  TOCS,%
  TOCT,%
  TODAES,%
  TODS,%
  TOG,%
  TOIS,%
  TOIT,%
  TOMACS,%
  TOMM,%
  TOMPECS,%
  TOMS,%
  TOPC,%
  TOPS,%
  TOPLAS,%
  TOS,%
  TOSEM,%
  TOSN,%
  TRETS,%
  TSAS,%
  TSC,%
  TSLP,%
  TWEB%
}{%
\ifcase\@journalCode@nr
\relax % CIE
  \def\@journalName{ACM Computers in Entertainment}%
  \def\@journalNameShort{ACM Comput. Entertain.}%
  \def\@permissionCodeOne{1544-3574}%
\or % CSUR
  \def\@journalName{ACM Computing Surveys}%
  \def\@journalNameShort{ACM Comput. Surv.}%
  \def\@permissionCodeOne{0360-0300}%
\or % DTRAP
  \def\@journalName{Digital Threats: Research and Practice}%
  \def\@journalNameShort{Digit. Threat. Res. Pract.}%
  \def\@permissionCodeOne{2576-5337}%
\or % IMWUT
  \def\@journalName{Proceedings of the ACM on Interactive, Mobile,
    Wearable and Ubiquitous Technologies}%
 \def\@journalNameShort{Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.}%
  \def\@permissionCodeOne{2474-9567}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % JACM
  \def\@journalName{Journal of the ACM}%
  \def\@journalNameShort{J. ACM}%
  \def\@permissionCodeOne{0004-5411}%
```

```
\or % JDIQ
  \def\@journalName{ACM Journal of Data and Information Quality}%
  \def\@journalNameShort{ACM J. Data Inform. Quality}%
  \def\@permissionCodeOne{1936-1955}%
\or % JEA
  \def\@journalName{ACM Journal of Experimental Algorithmics}%
  \def\@journalNameShort{ACM J. Exp. Algor.}%
  \def\@permissionCodeOne{1084-6654}%
\or % JERIC
  \def\@journalName{ACM Journal of Educational Resources in Computing}%
  \def\@journalNameShort{ACM J. Edu. Resources in Comput.}%
  \def\@permissionCodeOne{1073-0516}%
\or % JETC
 \def\@journalName{ACM Journal on Emerging Technologies in Computing Systems}%
  \def\@journalNameShort{ACM J. Emerg. Technol. Comput. Syst.}%
  \def\@permissionCodeOne{1550-4832}%
\or % JOCCH
  \def\@journalName{ACM Journal on Computing and Cultural Heritage}%
  \def\@journalNameShort{ACM J. Comput. Cult. Herit.}%
\or % PACMHCI
  \def\@journalName{Proceedings of the ACM on Human-Computer Interaction}%
  \def\@journalNameShort{Proc. ACM Hum.-Comput. Interact.}%
  \def\@permissionCodeOne{2573-0142}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % PACMPL
  \def\@journalName{Proceedings of the ACM on Programming Languages}%
  \def\@journalNameShort{Proc. ACM Program. Lang.}%
  \def\@permissionCodeOne{2475-1421}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % POMACS
 \def\@journalName{Proceedings of the ACM on Measurement and Analysis of Computing Systems}%
  \def\@journalNameShort{Proc. ACM Meas. Anal. Comput. Syst.}%
  \def\@permissionCodeOne{2476-1249}%
  \@ACM@screentrue
  \PackageInfo{\@classname}{Using screen mode due to \@journalCode}%
\or % TAAS
  \def\@journalName{ACM Transactions on Autonomous and Adaptive Systems}%
  \def\@journalNameShort{ACM Trans. Autonom. Adapt. Syst.}%
  \def\@permissionCodeOne{1556-4665}%
\or % TACCESS
  \def\@journalName{ACM Transactions on Accessible Computing}%
  \def\@journalNameShort{ACM Trans. Access. Comput.}%
  \def\@permissionCodeOne{1936-7228}%
\or % TACO
  \def\@journalName{ACM Transactions on Architecture and Code Optimization}%
  \def\@journalNameShort{ACM Trans. Arch. Code Optim.}%
\or % TALG
  \def\@journalName{ACM Transactions on Algorithms}%
```

```
  \def\@journalNameShort{ACM Trans. Algor.}%
  \def\@permissionCodeOne{1549-6325}%
\or % TALLIP
 \def\@journalName{ACM Transactions on Asian and Low-Resource Language Information Processing}%
  \def\@journalNameShort{ACM Trans. Asian Low-Resour. Lang. Inf. Process.}%
  \def\@permissionCodeOne{2375-4699}%
\or % TAP
  \def\@journalName{ACM Transactions on Applied Perception}%
\or % TCPS
  \def\@journalName{ACM Transactions on Cyber-Physical Systems}%
\or % TEAC
  \def\@journalName{ACM Transactions on Economics and Computation}%
\or % TECS
  \def\@journalName{ACM Transactions on Embedded Computing Systems}%
  \def\@journalNameShort{ACM Trans. Embedd. Comput. Syst.}%
  \def\@permissionCodeOne{1539-9087}%
\or % THRI
  \def\@journalName{ACM Transactions on Human-Robot Interaction}%
  \def\@journalNameShort{ACM Trans. Hum.-Robot Interact.}%
  \def\@permissionCodeOne{2573-9522}%
\or % TIIS
  \def\@journalName{ACM Transactions on Interactive Intelligent Systems}%
  \def\@journalNameShort{ACM Trans. Interact. Intell. Syst.}%
  \def\@permissionCodeOne{2160-6455}%
\or % TISSEC
  \def\@journalName{ACM Transactions on Information and System Security}%
  \def\@journalNameShort{ACM Trans. Info. Syst. Sec.}%
  \def\@permissionCodeOne{1094-9224}%
\or % TIST
  \def\@journalName{ACM Transactions on Intelligent Systems and Technology}%
  \def\@journalNameShort{ACM Trans. Intell. Syst. Technol.}%
  \def\@permissionCodeOne{2157-6904}%
\or % TKDD
  \def\@journalName{ACM Transactions on Knowledge Discovery from Data}%
  \def\@journalNameShort{ACM Trans. Knowl. Discov. Data.}%
  \def\@permissionCodeOne{1556-4681}%
\or % TMIS
  \def\@journalName{ACM Transactions on Management Information Systems}%
  \def\@journalNameShort{ACM Trans. Manag. Inform. Syst.}%
  \def\@permissionCodeOne{2158-656X}%
\or % TOCE
  \def\@journalName{ACM Transactions on Computing Education}%
  \def\@journalNameShort{ACM Trans. Comput. Educ.}%
  \def\@permissionCodeOne{1946-6226}%
\or % TOCHI
  \def\@journalName{ACM Transactions on Computer-Human Interaction}%
  \def\@journalNameShort{ACM Trans. Comput.-Hum. Interact.}%
  \def\@permissionCodeOne{1073-0516}%
\or % TOCL
  \def\@journalName{ACM Transactions on Computational Logic}%
```

```
  \def\@journalNameShort{ACM Trans. Comput. Logic}%
  \def\@permissionCodeOne{1529-3785}%
\or % TOCS
  \def\@journalName{ACM Transactions on Computer Systems}%
  \def\@journalNameShort{ACM Trans. Comput. Syst.}%
  \def\@permissionCodeOne{0734-2071}%
\or % TOCT
  \def\@journalName{ACM Transactions on Computation Theory}%
  \def\@journalNameShort{ACM Trans. Comput. Theory}%
  \def\@permissionCodeOne{1942-3454}%
\or % TODAES
 \def\@journalName{ACM Transactions on Design Automation of Electronic Systems}%
  \def\@journalNameShort{ACM Trans. Des. Autom. Electron. Syst.}%
  \def\@permissionCodeOne{1084-4309}%
\or % TODS
  \def\@journalName{ACM Transactions on Database Systems}%
  \def\@journalNameShort{ACM Trans. Datab. Syst.}%
  \def\@permissionCodeOne{0362-5915}%
\or % TOG
  \def\@journalName{ACM Transactions on Graphics}%
  \def\@journalNameShort{ACM Trans. Graph.}%
  \def\@permissionCodeOne{0730-0301}
\or % TOIS
  \def\@journalName{ACM Transactions on Information Systems}%
  \def\@permissionCodeOne{1046-8188}%
\or % TOIT
  \def\@journalName{ACM Transactions on Internet Technology}%
  \def\@journalNameShort{ACM Trans. Internet Technol.}%
  \def\@permissionCodeOne{1533-5399}%
\or % TOMACS
  \def\@journalName{ACM Transactions on Modeling and Computer Simulation}%
  \def\@journalNameShort{ACM Trans. Model. Comput. Simul.}%
\or % TOMM
 \def\@journalName{ACM Transactions on Multimedia Computing, Communications and Applications}%
  \def\@journalNameShort{ACM Trans. Multimedia Comput. Commun. Appl.}%
  \def\@permissionCodeOne{1551-6857}%
  \def\@permissionCodeTwo{0100}%
\or % TOMPECS
 \def\@journalName{ACM Transactions on Modeling and Performance Evaluation of Computing Systems}%
  \def\@journalNameShort{ACM Trans. Model. Perform. Eval. Comput. Syst.}%
  \def\@permissionCodeOne{2376-3639}%
\or % TOMS
  \def\@journalName{ACM Transactions on Mathematical Software}%
  \def\@journalNameShort{ACM Trans. Math. Softw.}%
  \def\@permissionCodeOne{0098-3500}%
\or % TOPC
  \def\@journalName{ACM Transactions on Parallel Computing}%
  \def\@journalNameShort{ACM Trans. Parallel Comput.}%
  \def\@permissionCodeOne{1539-9087}%
\or % TOPS
```

```
  \def\@journalName{ACM Transactions on Privacy and Security}%
  \def\@journalNameShort{ACM Trans. Priv. Sec.}%
  \def\@permissionCodeOne{2471-2566}%
\or % TOPLAS
  \def\@journalName{ACM Transactions on Programming Languages and Systems}%
  \def\@journalNameShort{ACM Trans. Program. Lang. Syst.}%
  \def\@permissionCodeOne{0164-0925}%
\or % TOS
  \def\@journalName{ACM Transactions on Storage}%
  \def\@journalNameShort{ACM Trans. Storage}%
  \def\@permissionCodeOne{1553-3077}%
\or % TOSEM
  \def\@journalName{ACM Transactions on Software Engineering and Methodology}%
  \def\@journalNameShort{ACM Trans. Softw. Eng. Methodol.}%
  \def\@permissionCodeOne{1049-331X}%
\or % TOSN
  \def\@journalName{ACM Transactions on Sensor Networks}%
  \def\@journalNameShort{ACM Trans. Sensor Netw.}%
  \def\@permissionCodeOne{1550-4859}%
\or % TRETS
  \def\@journalName{ACM Transactions on Reconfigurable Technology and Systems}%
  \def\@journalNameShort{ACM Trans. Reconfig. Technol. Syst.}%
  \def\@permissionCodeOne{1936-7406}%
\or % TSAS
  \def\@journalName{ACM Transactions on Spatial Algorithms and Systems}%
  \def\@journalNameShort{ACM Trans. Spatial Algorithms Syst.}%
  \def\@permissionCodeOne{2374-0353}%
\or % TSC
  \def\@journalName{ACM Transactions on Social Computing}%
  \def\@journalNameShort{ACM Trans. Soc. Comput.}%
  \def\@permissionCodeOne{2469-7818}%
\or % TSLP
  \def\@journalName{ACM Transactions on Speech and Language Processing}%
  \def\@journalNameShort{ACM Trans. Speech Lang. Process.}%
  \def\@permissionCodeOne{1550-4875}%
\or % TWEB
  \def\@journalName{ACM Transactions on the Web}%
  \def\@journalNameShort{ACM Trans. Web}%
  \def\@permissionCodeOne{1559-1131}%
\fi
\ClassInfo{\@classname}{Using journal code \@journalCode}%
}{%
  \ClassError{\@classname}{Incorrect journal #1}%
}%
```

\acmJournal And the syntactic sugar around it

```
\def\acmJournal#1{\setkeys{ACM}{acmJournal=#1}}
```

The defaults:

```
\def\@journalCode@nr{0}
```

```
\def\@journalName{}%
\def\@journalNameShort{\@journalName}%
\def\@permissionCodeOne{XXXX-XXXX}%
\def\@permissionCodeTwo{}%
```

`\acmConference` This is the conference command

```
\newcommand\acmConference[4][]{%
  \gdef\acmConference@shortname{#1}%
  \gdef\acmConference@name{#2}%
  \gdef\acmConference@date{#3}%
  \gdef\acmConference@venue{#4}%
  \ifx\acmConference@shortname\@empty
    \gdef\acmConference@shortname{#2}%
  \fi}
\acmConference[Conference'17]{ACM Conference}{July 2017}{Washington,
  DC, USA}
```

`\acmBooktitle` `\@acmBooktitle` The book title of the conference:

```
\def\acmBooktitle#1{\gdef\@acmBooktitle{#1}}
\acmBooktitle{Proceedings of \acmConference@name
       \ifx\acmConference@name\acmConference@shortname\else
         \ (\acmConference@shortname)\fi}
```

`\@editorsAbbrev` How to abbreviate editors

```
\def\@editorsAbbrev{(Ed.)}
```

`\@acmEditors` The list of editors

```
\def\@acmEditors{}
```

`\editor` Add a new editor to the list

```
\def\editor#1{\ifx\@acmEditors\@empty
    \gdef\@acmEditors{#1}%
  \else
    \gdef\@editorsAbbrev{(Eds.)}%
    \g@addto@macro\@acmEditors{\and#1}%
\fi}
```

`\subtitle` The subtitle macro

```
\def\subtitle#1{\def\@subtitle{#1}}
\subtitle{}
```

`\num@authorgroups` The total number of "groups". Each group is several authors with the same affiliations(s)

```
\newcount\num@authorgroups
\num@authorgroups=0\relax
```

`\num@authors` The total number of authors

```
\newcount\num@authors
\num@authors=0\relax
```

\if@insideauthorgroup Whether we are continuing an author group

```
\newif\if@insideauthorgroup
\@insideauthorgroupfalse
```

\author Adding an author to the list of authors and addresses

```
\renewcommand\author[2][]{%
  \global\advance\num@authors by 1\relax
  \if@insideauthorgroup\else
    \global\advance\num@authorgroups by 1\relax
    \global\@insideauthorgrouptrue
  \fi
  \ifx\addresses\@empty
    \if@ACM@anonymous
      \gdef\addresses{\@author{Anonymous Author(s)}}%
      \gdef\authors{Anonymous Author(s)}%
    \else
      \gdef\addresses{\@author{#2}}%
      \gdef\authors{#2}%
    \fi
  \else
    \if@ACM@anonymous\else
      \g@addto@macro\addresses{\and\@author{#2}}%
      \g@addto@macro\authors{\and#2}%
    \fi
  \fi
  \if@ACM@anonymous
    \ifx\shortauthors\@empty
      \gdef\shortauthors{Anon.}%
    \fi
  \else
    \def\@tempa{#1}%
    \ifx\@tempa\@empty
      \ifx\shortauthors\@empty
        \gdef\shortauthors{#2}%
      \else
        \g@addto@macro\shortauthors{\and#2}%
      \fi
    \else
      \ifx\shortauthors\@empty
        \gdef\shortauthors{#1}%
      \else
        \g@addto@macro\shortauthors{\and#1}%
      \fi
    \fi
  \fi}
```

\affiliation The macro \affiliation mimics \address from amsart. Note that it has an optional argument, which we use differently from amsart.

```
\newcommand{\affiliation}[2][]{%
```

```
  \global\@insideauthorgroupfalse
  \if@ACM@anonymous\else
    \g@addto@macro\addresses{\affiliation{#1}{#2}}%
  \fi}
```

`\@ACM@affiliation@obeypunctuation` Whether to use the author's punctuation (false by default, which adds American-style address punctuation)

```
\define@boolkey+{@ACM@affiliation@}[@ACM@affiliation@]{obeypunctuation}%
[true]{}{\ClassError{\@classname}{The option obeypunctuation can be either true or false}}
```

`\additionalaffiliation` Additional affiliations go to footnotes

```
\def\additionalaffiliation#1{\authornote{\@additionalaffiliation{#1}}}
```

`\@additionalaffiliation` Process `\additionalaffiliation` inside `\authornote`

```
\def\@additionalaffiliation#1{\bgroup
  \def\position##1{\ignorespaces}%
  \def\institution##1{##1\ignorespaces}%
  \def\department{\@ifnextchar[{\@department}{\@department[]}}%
  \def\@department[##1]##2{\unskip, ##2\ignorespaces}%
  \let\streetaddress\position
  \let\city\position
  \let\state\position
  \let\postcode\position
  \let\country\position
  Also with #1\unskip.\egroup}
```

`\email` The macro `\email` mimics `\email` from `amsart`. Again, it has an optional argument that we do not currently need but keep for possible future use.

```
\renewcommand{\email}[2][]{%
  \if@ACM@anonymous\else
    \g@addto@macro\addresses{\email{#1}{#2}}%
  \fi}
```

`\orcid` Right now we do not typeset ORCIDs

```
\def\orcid#1{\unskip\ignorespaces}
```

`\authorsaddresses` Setting up authors' addresses

```
\def\authorsaddresses#1{\def\@authorsaddresses{#1}}
\authorsaddresses{\@mkauthorsaddresses}
```

`\@titlenotes` The title notes

```
\def\@titlenotes{}
```

`\titlenote` Adding a note to the title

```
\def\titlenote#1{%
  \g@addto@macro\@title{\footnotemark}%
  \if@ACM@anonymous
    \g@addto@macro\@titlenotes{%
```

```
      \stepcounter{footnote}\footnotetext{Title note}}%
  \else
    \g@addto@macro\@titlenotes{\stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

`\@subtitlenotes` The subtitle notes

```
\def\@subtitlenotes{}
```

`\subtitlenote` Adding a note to the subtitle

```
\def\subtitlenote#1{%
  \g@addto@macro\@subtitle{\footnotemark}%
  \if@ACM@anonymous
    \g@addto@macro\@subtitlenotes{%
      \stepcounter{footnote}\footnotetext{Subtitle note}}%
  \else
    \g@addto@macro\@subtitlenotes{%
      \stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

`\@authornotes` The author notes

```
\def\@authornotes{}
```

`\authornote` Adding a note to the author

```
\def\authornote#1{%
  \if@ACM@anonymous\else
    \g@addto@macro\addresses{\@authornotemark}%
    \g@addto@macro\@authornotes{%
      \stepcounter{footnote}\footnotetext{#1}}%
  \fi}
```

`\authornotemark` Adding a footnote mark to the authors

```
\newcommand\authornotemark[1][\relax]{%
  \ifx#1\relax\relax\relax
  \g@addto@macro\addresses{\@authornotemark}%
  \else
  \g@addto@macro\addresses{\@@authornotemark{#1}}%
  \fi}
```

`\acmVolume` The current volume

```
\def\acmVolume#1{\def\@acmVolume{#1}}
\acmVolume{1}
```

`\acmNumber` The current number

```
\def\acmNumber#1{\def\@acmNumber{#1}}
\acmNumber{1}
```

`\acmArticle` The current article

```
\def\acmArticle#1{\def\@acmArticle{#1}}
\acmArticle{}
```

`\acmArticleSeq` The sequence number

```
\def\acmArticleSeq#1{\def\@acmArticleSeq{#1}}
\acmArticleSeq{\@acmArticle}
```

`\acmYear` The current year

```
\def\acmYear#1{\def\@acmYear{#1}}
\acmYear{\the\year}
```

`\acmMonth` The current month

```
\def\acmMonth#1{\def\@acmMonth{#1}}
\acmMonth{\the\month}
```

`\@acmPubDate` The publication date

```
\def\@acmPubDate{\ifcase\@acmMonth\or
  January\or February\or March\or April\or May\or June\or
  July\or August\or September\or October\or November\or
  December\fi~\@acmYear}
```

`\acmPrice` The price

```
\def\acmPrice#1{\def\@acmPrice{#1}}
\acmPrice{15.00}
```

`\acmSubmissionID` The submission ID

```
\def\acmSubmissionID#1{\def\@acmSubmissionID{#1}}
\acmSubmissionID{}
```

`\acmISBN` The book ISBN

```
\def\acmISBN#1{\def\@acmISBN{#1}}
\acmISBN{978-x-xxxx-xxxx-x/YY/MM}
```

`\acmDOI` The paper DOI

```
\def\acmDOI#1{\def\@acmDOI{#1}}
\acmDOI{10.1145/nnnnnnn.nnnnnnn}
```

`\if@ACM@badge` Whether to print a badge. Note that either a left or right badge triggers it:

```
\newif\if@ACM@badge
\@ACM@badgefalse
```

`\@ACM@badge@width` The width of the badge

```
\newlength\@ACM@badge@width
\setlength\@ACM@badge@width{5pc}
```

`\@ACM@title@width` The width of the badge

```
\newlength\@ACM@title@width
```

`\@ACM@badge@skip` The space between the badge and the title

```
\newlength\@ACM@badge@skip
\setlength\@ACM@badge@skip{1pc}
```

\acmBadgeR Setting the right badge

```
\newcommand\acmBadgeR[2][]{\@ACM@badgetrue
  \def\@acmBadgeR@url{#1}%
  \def\@acmBadgeR@image{#2}}
\def\@acmBadgeR@url{}
\def\@acmBadgeR@image{}
```

\acmBadgeL Setting the left badge

```
\newcommand\acmBadgeL[2][]{\@ACM@badgetrue
  \def\@acmBadgeL@url{#1}%
  \def\@acmBadgeL@image{#2}}
\def\@acmBadgeL@url{}
\def\@acmBadgeL@image{}
```

\startPage The start page of the paper

```
\def\startPage#1{\def\@startPage{#1}}
\startPage{}
```

\terms Terms are obsolete. We use CCS now.

```
\def\terms#1{\ClassWarning{\@classname}{The command \string\terms{} is
    obsolete.  I am going to ignore it}}
```

\keywords Keywords are mostly obsolete. We use CCS now. Still it makes sense to keep them for compatibility.

```
\def\keywords#1{\def\@keywords{#1}}
\keywords{}
```

abstract The amsart package puts abstract in a box. Since we do not know whether we will use two-column mode, we prefer to save the text

```
\renewenvironment{abstract}{\Collect@Body\@saveabstract}{}
```

\@saveabstract And saving the abstract

```
\long\def\@saveabstract#1{\long\gdef\@abstract{#1}}
\@saveabstract{}
```

\@lempty The long version of \@empty (to compare with \@abstract)

```
\long\def\@lempty{}
```

\if@ACM@printccs Whether to print CCS

```
\define@boolkey+{@ACM@topmatter@}[@ACM@]{printccs}[true]{%
  \if@ACM@printccs
    \ClassInfo{\@classname}{Printing CCS}%
  \else
    \ClassInfo{\@classname}{Suppressing CCS}%
  \fi}{\ClassError{\@classname}{The option printccs can be either true or false}}
```

\if@ACM@printacmref Whether to print the ACM bibstrip

```
\define@boolkey+{@ACM@topmatter@}[@ACM@]{printacmref}[true]{%
  \if@ACM@printacmref
    \ClassInfo{\@classname}{Printing bibformat}%
  \else
    \ClassInfo{\@classname}{Suppressing bibformat}%
  \fi}{\ClassError{\@classname}{The option printacmref can be either true or false}}
```

\if@ACM@printfolios Whether to print folios

```
\define@boolkey+{@ACM@topmatter@}[@ACM@]{printfolios}[true]{%
  \if@ACM@printfolios
    \ClassInfo{\@classname}{Printing folios}%
  \else
    \ClassInfo{\@classname}{Suppressing folios}%
  \fi}{\ClassError{\@classname}{The option printfolios can be either true or false}}
```

\@ACM@authorsperrow The number of authors per row. 0 means use the default algorithm.

```
\define@cmdkey{@ACM@topmatter@}[@ACM@]{authorsperrow}[0]{%
  \IfInteger{#1}{\ClassInfo{\@classname}{Setting authorsperrow to
      #1}}{\ClassWarning{\@classname}{The parameter authorsperrow must be
      numerical. Ignoring the input #1}\gdef\@ACM@authorsperrow{0}}}
```

\settopmatter The usual syntactic sugar

```
\def\settopmatter#1{\setkeys{@ACM@topmatter@}{#1}}
```

Now the settings

```
\settopmatter{printccs=true, printacmref=true}
\if@ACM@manuscript
  \settopmatter{printfolios=true}
\else
  \if@ACM@journal
    \settopmatter{printfolios=true}
  \else
    \settopmatter{printfolios=false}
  \fi
\fi
\settopmatter{authorsperrow=0}
```

\@received The container for the paper history

```
\def\@received{}
```

\received The \received command

```
\newcommand\received[2][]{\def\@tempa{#1}%
  \ifx\@tempa\@empty
    \ifx\@received\@empty
      \gdef\@received{Received #2}%
    \else
      \g@addto@macro{\@received}{; revised #2}%
    \fi
```

```
  \else
    \ifx\@received\@empty
      \gdef\@received{#1 #2}%
    \else
      \g@addto@macro{\@received}{; #1 #2}%
    \fi
  \fi}
\AtEndDocument{%
  \ifx\@received\@empty\else
    \par\bigskip\noindent\small\normalfont\@received\par
  \fi}
```

3.12 Concepts system

We exclude CCSXML stuff generated by the ACM system:

```
\RequirePackage{comment}
\excludecomment{CCSXML}
```

`\@concepts` This is the storage macro for concepts

```
\let\@concepts\@empty
```

`\ccsdesc` The first argument is the significance, the second is the concept(s)

```
\newcommand\ccsdesc[2][100]{%
  \ccsdesc@parse#1~#2~~\ccsdesc@parse@end}
```

`\ccsdesc@parse` The parser of the expression `Significance~General~Specific` (we need `textcomp` for `\textrightarrow`). Note that `Specific` can be empty!

```
\RequirePackage{textcomp}
\def\ccsdesc@parse#1~#2~#3~{%
  \expandafter\ifx\csname CCS@General@#2\endcsname\relax
    \expandafter\gdef\csname CCS@General@#2\endcsname{\textbullet\
      \textbf{#2}}%
    \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{; }%
    \expandafter\gdef\csname CCS@Specific@#2\endcsname{}%
  \g@addto@macro{\@concepts}{\csname CCS@General@#2\endcsname
    \csname CCS@Punctuation@#2\endcsname
    \csname CCS@Specific@#2\endcsname}%
  \fi
  \ifx#3\relax\relax\else
    \expandafter\gdef\csname CCS@Punctuation@#2\endcsname{
      \textrightarrow\ }%
   \expandafter\g@addto@macro\expandafter{\csname CCS@Specific@#2\endcsname}{%
     \ifnum#1>499\textbf{#3}; \else
     \ifnum#1>299\textit{#3}; \else
     #3; \fi\fi}%
  \fi
\ccsdesc@parse@finish}
```

`\ccdesc@parse@finish` Gobble everything to `\ccsdesc@parse@end`

```
\def\ccsdesc@parse@finish#1\ccsdesc@parse@end{}
```

3.13 Copyright system

This is from acmcopyright.sty

\if@printcopyright Whether to print a copyright symbol

```
\newif\if@printcopyright
\@printcopyrighttrue
```

\if@printpermission Whether to print the permission block

```
\newif\if@printpermission
\@printpermissiontrue
```

\if@acmowned Whether the ACM owns the rights to the paper

```
\newif\if@acmowned
\@acmownedtrue
```

Keys:

```
\define@choicekey*{ACM@}{acmcopyrightmode}[%
  \acm@copyrightinput\acm@copyrightmode]{none,%
    acmcopyright,acmlicensed,rightsretained,%
    usgov,usgovmixed,cagov,cagovmixed,licensedusgovmixed,%
    licensedcagov,licensedcagovmixed,othergov,licensedothergov,%
    iw3c2w3,iw3c2w3g}{%
  \@printpermissiontrue
  \@printcopyrighttrue
  \@acmownedtrue
  \ifnum\acm@copyrightmode=0\relax % none
   \@printpermissionfalse
   \@printcopyrightfalse
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=2\relax % acmlicensed
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=3\relax % rightsretained
   \@acmownedfalse
   \acmPrice{}%
  \fi
  \ifnum\acm@copyrightmode=4\relax % usgov
   \@printpermissiontrue
   \@printcopyrightfalse
   \@acmownedfalse
   \acmPrice{}%
  \fi
  \ifnum\acm@copyrightmode=6\relax % cagov
   \@acmownedfalse
  \fi
  \ifnum\acm@copyrightmode=8\relax % licensedusgovmixed
   \@acmownedfalse
  \fi
```

```
\ifnum\acm@copyrightmode=9\relax % licensedcagov
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=10\relax % licensedcagovmixed
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=11\relax % othergov
 \@acmownedtrue
\fi
\ifnum\acm@copyrightmode=12\relax % licensedothergov
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=13\relax % iw3c2w3
 \@acmownedfalse
\fi
\ifnum\acm@copyrightmode=14\relax % iw3c2w3g
 \@acmownedfalse
\fi}
```

`\setcopyright` This is the syntactic sugar around setting keys.

```
\def\setcopyright#1{\setkeys{ACM@}{acmcopyrightmode=#1}}
\setcopyright{acmcopyright}
```

`\@copyrightowner` Here is the owner of the copyright

```
\def\@copyrightowner{%
 \ifcase\acm@copyrightmode\relax % none
 \or % acmcopyright
 Association for Computing Machinery.
 \or % acmlicensed
 Copyright held by the owner/author(s). Publication rights licensed to
 the Association for Computing Machinery.
 \or % rightsretained
 Copyright held by the owner/author(s).
 \or % usgov
 \or % usgovmixed
 Association for Computing Machinery.
 \or % cagov
 Crown in Right of Canada.
 \or %cagovmixed
 Association for Computing Machinery.
 \or %licensedusgovmixed
 Copyright held by the owner/author(s). Publication rights licensed to
 the Association for Computing Machinery.
 \or % licensedcagov
 Crown in Right of Canada. Publication rights licensed to
 the Association for Computing Machinery.
 \or %licensedcagovmixed
 Copyright held by the owner/author(s). Publication rights licensed to
 the Association for Computing Machinery.
 \or % othergov
```

```
Association for Computing Machinery.
\or % licensedothergov
Copyright held by the owner/author(s). Publication rights licensed to
the Association for Computing Machinery.
\or % ic2w3www
IW3C2 (International World Wide Web Conference Committee), published
under Creative Commons CC~BY~4.0 License.
\or % ic2w3wwwgoogle
IW3C2 (International World Wide Web Conference Committee), published
under Creative Commons CC~BY-NC-ND~4.0 License.
\fi}
```

`\@formatdoi` Print a clickable DOI

```
\def\@formatdoi#1{\url{https://doi.org/#1}}
```

`\@copyrightpermission` The canned permission block.

```
\def\@copyrightpermission{%
  \ifcase\acm@copyrightmode\relax % none
  \or % acmcopyright
   Permission to make digital or hard copies of all or part of this
   work for personal or classroom use is granted without fee provided
   that copies are not made or distributed for profit or commercial
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   honored. For all other uses, contact the
   owner\hspace*{.5pt}/author(s).
  \or % usgov
   This paper is authored by an employee(s) of the United States
```

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  disseminate the work on their personal and corporate Web sites with
  the appropriate attribution.
\fi}
```

`\copyrightyear` By default, the copyright year is the same as `\acmYear`, but one can override this:

```
\def\copyrightyear#1{\def\@copyrightyear{#1}}
\copyrightyear{\@acmYear}
```

`\@teaserfigures` The teaser figures container

```
\def\@teaserfigures{}
```

`teaserfigure` The teaser figure

```
\newenvironment{teaserfigure}{\Collect@Body\@saveteaser}{}
```

\@saveteaser Saving the teaser

```
\long\def\@saveteaser#1{\g@addto@macro\@teaserfigures{\@teaser{#1}}}
```

\thanks We redefine amsart \thanks so the anonymous key works

```
\renewcommand{\thanks}[1]{%
  \@ifnotempty{#1}{%
    \if@ACM@anonymous
      \g@addto@macro\thankses{\thanks{A note}}%
   \else
    \g@addto@macro\thankses{\thanks{#1}}%
   \fi}}
```

3.14 Typesetting top matter

\mktitle@bx Some of our formats use a two-column design. Some use a one-column design. In all cases we use a wide title. Thus we typeset the top matter in a special box to be used in the construction \@twocolumn[⟨*box*⟩].

```
\newbox\mktitle@bx
```

\maketitle The (in)famous \maketitle. Note that in sigchi-a mode, authors are *not* in the title box.

Another note: there is a subtle difference between author notes, title notes and thanks. The latter two refer to the paper itself and therefore belong to the copyright/permission block. By the way, this was the default behavior of the old ACM classes.

```
\def\maketitle{%
  \if@ACM@anonymous
    % Anonymize omission of \author-s
    \ifnum\num@authorgroups=0\author{}\fi
  \fi
  \begingroup
  \let\@footnotemark\@footnotemark@nolink
  \let\@footnotetext\@footnotetext@nolink
  \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
  \global\@topnum\z@ % this prevents floats from falling
                     % at the top of page 1
  \global\@botnum\z@ % we do not want them to be on the bottom either
  \hsize=\textwidth
  \def\@makefnmark{\hbox{\@textsuperscript{\@thefnmark}}}%
  \@mktitle\if@ACM@sigchiamode\else\@mkauthors\fi\@mkteasers
  \@printtopmatter
  \if@ACM@sigchiamode\@mkauthors\fi
  \setcounter{footnote}{0}%
  \def\@makefnmark{\hbox{\@textsuperscript{\normalfont\@thefnmark}}}%
  \@titlenotes
  \@subtitlenotes
  \@authornotes
  \let\@makefnmark\relax
  \let\@thefnmark\relax
```

```
\let\@makefntext\noindent
\ifx\@empty\thankses\else
  \footnotetextauthorsaddresses{%
    \def\par{\let\par\@par}\parindent\z@\@setthanks}%
\fi
\ifx\@empty\@authorsaddresses\else
   \if@ACM@anonymous\else
     \if@ACM@journal
       \footnotetextauthorsaddresses{%
         \def\par{\let\par\@par}\parindent\z@\@setauthorsaddresses}%
     \fi
   \fi
\fi
\footnotetextcopyrightpermission{%
  \if@ACM@authordraft
      \raisebox{-2ex}[\z@][\z@]{\makebox[0pt][l]{\large\bfseries
          Unpublished working draft. Not for distribution.}}%
    \color[gray]{0.9}%
  \fi
  \parindent\z@\parskip0.1\baselineskip
  \if@ACM@authorversion\else
    \if@printpermission\@copyrightpermission\par\fi
  \fi
  \if@ACM@manuscript\else
     \if@ACM@journal\else % Print the conference information
    {\itshape \acmConference@shortname, \acmConference@date, \acmConference@venue}\par
     \fi
  \fi
  \if@printcopyright
    \copyright\ \@copyrightyear\ \@copyrightowner\\
  \else
   \@copyrightyear.\
  \fi
  \if@ACM@manuscript
    Manuscript submitted to ACM\\
  \else
    \if@ACM@authorversion
        This is the author's version of the work. It is posted here for
        your personal use. Not for redistribution. The definitive Version
        of Record was published in
        \if@ACM@journal
          \emph{\@journalName}%
        \else
          \emph{\@acmBooktitle}%
        \fi
        \ifx\@acmDOI\@empty
        .
        \else
          , \@formatdoi{\@acmDOI}.
        \fi\\
```

```
      \else
        \if@ACM@journal
          \@permissionCodeOne/\@acmYear/\@acmMonth-ART\@acmArticle
          \ifx\@acmPrice\@empty\else\ \$\@acmPrice\fi\\
          \@formatdoi{\@acmDOI}%
        \else % Conference
          \ifx\@acmISBN\@empty\else ACM~ISBN~\@acmISBN
          \ifx\@acmPrice\@empty.\else\dots\$\@acmPrice\fi\\\fi
          \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi%
        \fi
      \fi
    \fi}
\endgroup
\setcounter{footnote}{0}%
\@mkabstract
\if@ACM@printccs
  \ifx\@concepts\@empty\else\bgroup
    {\@specialsection{CCS Concepts}%
       \@concepts\par}\egroup
   \fi
 \fi
 \ifx\@keywords\@empty\else\bgroup
    {\if@ACM@journal
       \@specialsection{Additional Key Words and Phrases}%
     \else
       \@specialsection{Keywords}%
     \fi
       \@keywords}\par\egroup
 \fi
\andify\authors
\andify\shortauthors
\global\let\authors=\authors
\global\let\shortauthors=\shortauthors
\if@ACM@printacmref
   \@mkbibcitation
\fi
\hypersetup{%
  pdflang={English},
  pdfdisplaydoctitle,
  pdfauthor={\authors},
  pdftitle={\@title},
  pdfsubject={\@concepts},
  pdfkeywords={\@keywords},
  pdfcreator={LaTeX with acmart
    \csname ver@acmart.cls\endcsname\space
    and hyperref
    \csname ver@hyperref.sty\endcsname}}%
\@printendtopmatter
\@afterindentfalse
\@afterheading
```

```
}
```

`\@specialsection` This macro starts sections for proceedings and uses `\small` for journals

```
\def\@specialsection#1{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \par\medskip\small\noindent#1: %
  \or % acmsmall
    \par\medskip\small\noindent#1: %
  \or % acmlarge
    \par\medskip\small\noindent#1: %
  \or % acmtog
    \par\medskip\small\noindent#1: %
  \or % sigconf
    \section*{#1}%
  \or % siggraph
    \section*{#1}%
  \or % sigplan
    \paragraph*{#1}%
  \or % sigchi
    \section*{#1}%
  \or % sigchi-a
    \section*{#1}%
  \fi}
```

`\@printtopmatter` The printing of top matter starts a new page and uses the given title box. Note that for `sigchi-a` we print badges here rather than in `\mktitle` since we want them in the margins.

```
\def\@printtopmatter{%
  \ifx\@startPage\@empty
     \gdef\@startPage{1}%
  \else
     \setcounter{page}{\@startPage}%
  \fi
  \thispagestyle{firstpagestyle}%
  \noindent
  \ifcase\ACM@format@nr
  \relax % manuscript
    \box\mktitle@bx\par
  \or % acmsmall
    \box\mktitle@bx\par
  \or % acmlarge
    \box\mktitle@bx\par
  \or % acmtog
    \twocolumn[\box\mktitle@bx]%
  \or % sigconf
    \twocolumn[\box\mktitle@bx]%
  \or % siggraph
    \twocolumn[\box\mktitle@bx]%
```

```
  \or % sigplan
    \twocolumn[\box\mktitle@bx]%
  \or % sigchi
    \twocolumn[\box\mktitle@bx]%
  \or % sigchi-a
    \par\box\mktitle@bx\par\bigskip
    \if@ACM@badge
       \marginpar{\noindent
         \ifx\@acmBadgeL@image\@empty\else
           \href{\@acmBadgeL@url}{%
             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}%
            \hskip\@ACM@badge@skip
          \fi
         \ifx\@acmBadgeR@image\@empty\else
           \href{\@acmBadgeR@url}{%
             \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}%
          \fi}%
    \fi
  \fi
}
```

`\@mktitle` The title of the article

```
\def\@mktitle{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \@mktitle@i
  \or % acmsmall
    \@mktitle@i
  \or % acmlarge
    \@mktitle@i
  \or % acmtog
    \@mktitle@i
  \or % sigconf
    \@mktitle@iii
  \or % siggraph
    \@mktitle@iii
  \or % sigplan
    \@mktitle@iii
  \or % sigchi
    \@mktitle@iii
  \or % sigchi-a
    \@mktitle@iv
  \fi
}
```

`\@titlefont` The font to typeset the title

```
\def\@titlefont{%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \LARGE\sffamily\bfseries
```

```
  \or % acmsmall
    \LARGE\sffamily\bfseries
  \or % acmlarge
    \LARGE\sffamily\bfseries
  \or % acmtog
    \Huge\sffamily
  \or % sigconf
    \Huge\sffamily\bfseries
  \or % siggraph
    \Huge\sffamily\bfseries
  \or % sigplan
    \Huge\bfseries
  \or % sigchi
    \Huge\sffamily\bfseries
  \or % sigchi-a
     \Huge\bfseries
  \fi}
```

`\@subtitlefont` The font to typeset the subtitle

```
\def\@subtitlefont{\normalsize
  \ifcase\ACM@format@nr
  \relax % manuscript
    \mdseries
  \or % acmsmall
    \mdseries
  \or % acmlarge
    \mdseries
  \or % acmtog
     \LARGE
  \or % sigconf
     \LARGE\mdseries
  \or % siggraph
     \LARGE\mdseries
  \or % sigplan
     \LARGE\mdseries
  \or % sigchi
     \LARGE\mdseries
  \or % sigchi-a
     \mdseries
  \fi}
```

`\@mktitle@i` The version of `\mktitle` for most journals

```
\def\@mktitle@i{\hsize=\textwidth
  \@ACM@title@width=\hsize
  \ifx\@acmBadgeL@image\@empty\else
    \advance\@ACM@title@width by -\@ACM@badge@width
    \advance\@ACM@title@width by -\@ACM@badge@skip
  \fi
  \ifx\@acmBadgeR@image\@empty\else
    \advance\@ACM@title@width by -\@ACM@badge@width
```

```
  \advance\@ACM@title@width by -\@ACM@badge@skip
 \fi
 \setbox\mktitle@bx=\vbox{\noindent\@titlefont
  \ifx\@acmBadgeL@image\@empty\else
   \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
       \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
   \hskip\@ACM@badge@skip
  \fi
  \parbox[t]{\@ACM@title@width}{\raggedright
   \@titlefont\noindent
   \@title
 \ifx\@subtitle\@empty\else
  \par\noindent{\@subtitlefont\@subtitle}
 \fi}%
 \ifx\@acmBadgeR@image\@empty\else
  \hskip\@ACM@badge@skip
  \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
      \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
 \fi
 \par\bigskip}}%
```

`\@mktitle@ii` The version of `\mktitle` for TOG. Since v1.06, this is subsumed by the `\mktitle@i` macro

`\@mktitle@iii` The version of `\@mktitle` for SIG proceedings. Note that since the title is centered, we leave space for the left badge even if only the right badge is defined.

```
\def\@mktitle@iii{\hsize=\textwidth
   \setbox\mktitle@bx=\vbox{\@titlefont\centering
     \@ACM@title@width=\hsize
     \if@ACM@badge
       \advance\@ACM@title@width by -2\@ACM@badge@width
       \advance\@ACM@title@width by -2\@ACM@badge@skip
       \parbox[b]{\@ACM@badge@width}{\strut
         \ifx\@acmBadgeL@image\@empty\else
           \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeL@url}{%
            \includegraphics[width=\@ACM@badge@width]{\@acmBadgeL@image}}}%
         \fi}%
       \hskip\@ACM@badge@skip
     \fi
     \parbox[t]{\@ACM@title@width}{\centering\@titlefont
       \@title
       \ifx\@subtitle\@empty\else
         \par\noindent{\@subtitlefont\@subtitle}
       \fi
     }%
     \if@ACM@badge
       \hskip\@ACM@badge@skip
       \parbox[b]{\@ACM@badge@width}{\strut
         \ifx\@acmBadgeR@image\@empty\else
           \raisebox{-.5\baselineskip}[\z@][\z@]{\href{\@acmBadgeR@url}{%
```

```
            \includegraphics[width=\@ACM@badge@width]{\@acmBadgeR@image}}}%
          \fi}%
      \fi
      \par\bigskip}}%
```

`\@mktitle@iv` The version of `\@mktitle` for `sigchi-a`

```
\def\@mktitle@iv{\hsize=\textwidth
    \setbox\mktitle@bx=\vbox{\raggedright\leftskip5pc\@titlefont
      \noindent\leavevmode\leaders\hrule height 2pt\hfill\kern0pt\par
      \noindent\@title
     \ifx\@subtitle\@empty\else
       \par\noindent\@subtitlefont\@subtitle
     \fi
     \par\bigskip}}%
```

`\@ACM@addtoaddress` This macro adds an item to the address using the following rules:

1. If we start a paragraph, add the item
2. Otherwise, add a comma and the item
3. However, the comma is deleted if it is at the end of a line. We use the magic `\cleaders` trick for this.

```
\newbox\@ACM@commabox
\def\@ACM@addtoaddress#1{%
  \ifvmode\else
    \if@ACM@affiliation@obeypunctuation\else
    \setbox\@ACM@commabox=\hbox{, }%
    \unskip\cleaders\copy\@ACM@commabox\hskip\wd\@ACM@commabox
  \fi\fi
  #1}
```

`\institution` `\position` `\department` `\streetaddress` `\city` `\state` `\postcode` `\country` Theoretically we can define the macros for `\affiliation` inside the `\@mkauthors`-style commands. However, this would lead to a strange error if an author uses them outside `\affiliation`. Of course we can make them produce an error message, but…

```
\def\streetaddress#1{\unskip\ignorespaces}
\def\postcode#1{\unskip\ignorespaces}
\if@ACM@journal
  \def\position#1{\unskip\ignorespaces}
  \def\institution#1{\unskip~#1\ignorespaces}
  \def\city#1{\unskip\ignorespaces}
  \def\state#1{\unskip\ignorespaces}
  \newcommand\department[2][0]{\unskip\ignorespaces}
 \def\country#1{\if@ACM@affiliation@obeypunctuation\else, \fi#1\ignorespaces}
\else
  \def\position#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
  \def\institution#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
  \newcommand\department[2][0]{\if@ACM@affiliation@obeypunctuation
    #2\else#2\par\fi}%
```

```
% \def\streetaddress#1{\if@ACM@affiliation@obeypunctuation#1\else#1\par\fi}%
  \let\city\@ACM@addtoaddress
  \let\state\@ACM@addtoaddress
% \def\postcode#1{\if@ACM@affiliation@obeypunctuation#1\else\unskip\space#1\fi}%
  \let\country\@ACM@addtoaddress
\fi
```

`\@mkauthors` Typesetting the authors

```
\def\@mkauthors{\begingroup
  \hsize=\textwidth
  \ifcase\ACM@format@nr
  \relax % manuscript
    \@mkauthors@i
  \or % acmsmall
    \@mkauthors@i
  \or % acmlarge
    \@mkauthors@i
  \or % acmtog
    \@mkauthors@i
  \or % sigconf
    \@mkauthors@iii
  \or % siggraph
    \@mkauthors@iii
  \or % sigplan
    \@mkauthors@iii
  \or % sigchi
    \@mkauthors@iii
  \or % sigchi-a
    \@mkauthors@iv
  \fi
  \endgroup
}
```

`\@authorfont` Somehow different conferences use different fonts for author names. Why?

```
\def\@authorfont{\Large\sffamily}
```

`\@affiliationfont` Font for affiliations

```
\def\@affiliationfont{\normalsize\normalfont}
```

Adjusting fonts for different formats

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
  \def\@authorfont{\large\sffamily}
  \def\@affiliationfont{\small\normalfont}
\or % acmlarge
\or % acmtog
  \def\@authorfont{\LARGE\sffamily}
  \def\@affiliationfont{\large}
```

```
\or % sigconf
  \def\@authorfont{\LARGE}
  \def\@affiliationfont{\large}
\or % siggraph
  \def\@authorfont{\normalsize\normalfont}
  \def\@affiliationfont{\normalsize\normalfont}
\or % sigplan
  \def\@authorfont{\Large\normalfont}
  \def\@affiliationfont{\normalsize\normalfont}
\or % sigchi
  \def\@authorfont{\bfseries}
  \def\@affiliationfont{\mdseries}
\or % sigchi-a
  \def\@authorfont{\bfseries}
  \def\@affiliationfont{\mdseries}
\fi
```

`\@typeset@author@line` At this point we have `\@currentauthors` and `\@currentaffiliations`. We typeset them in the journal style

```
\def\@typeset@author@line{%
  \andify\@currentauthors\par\noindent
  \@currentauthors\def\@currentauthors{}%
  \ifx\@currentaffiliations\@empty\else
    \andify\@currentaffiliations
      \unskip, {\@currentaffiliations}\par
  \fi
  \def\@currentaffiliations{}}
```

`\@mkauthors@i` This version is used in most journal formats. Note that `\and` between authors with the same affiliation becomes ␣and␣:

```
\def\@mkauthors@i{%
  \def\@currentauthors{}%
  \def\@currentaffiliations{}%
  \global\let\and\@typeset@author@line
  \def\@author##1{%
    \ifx\@currentauthors\@empty
      \gdef\@currentauthors{\@authorfont\MakeTextUppercase{##1}}%
    \else
       \g@addto@macro{\@currentauthors}{\and\MakeTextUppercase{##1}}%
    \fi
    \gdef\and{}}%
  \def\email##1##2{}%
  \def\affiliation##1##2{%
    \def\@tempa{##2}\ifx\@tempa\@empty\else
       \ifx\@currentaffiliations\@empty
          \gdef\@currentaffiliations{%
            \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
            \setkeys{@ACM@affiliation@}{##1}%
            \@affiliationfont##2}%
```

```
      \else
        \g@addto@macro{\@currentaffiliations}{\and
          \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
          \setkeys{@ACM@affiliation@}{##1}##2}%
      \fi
    \fi
     \global\let\and\@typeset@author@line}%
  \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par\medskip
    \noindent\addresses\@typeset@author@line
   \par\medskip}%
}
```

`\@mkauthors@ii` The `\@mkauthors@ii` command was the version used in `acmtog`. It is no longer necessary.

`\author@bx` The box to put an individual author in

```
\newbox\author@bx
```

`\author@bx@wd` The width of the author box

```
\newdimen\author@bx@wd
```

`\author@bx@sep` The separation between author boxes

```
\newskip\author@bx@sep
\author@bx@sep=1pc\relax
```

`\@typeset@author@bx` Typesetting the box with authors. Note that in `sigchi-a` the box is not centered.

```
\def\@typeset@author@bx{\bgroup\hsize=\author@bx@wd\def\and{\par}%
  \global\setbox\author@bx=\vtop{\if@ACM@sigchiamode\else\centering\fi
    \@authorfont\@currentauthors\par\@affiliationfont
    \@currentaffiliation}\egroup
  \box\author@bx\hspace{\author@bx@sep}%
  \gdef\@currentauthors{}%
  \gdef\@currentaffiliation{}}
```

`\@mkauthors@iii` The `sigconf` version. Here we use a centered design with each author in a separate box.

```
\def\@mkauthors@iii{%
```

First, we need to determine the design of the author strip. The boxes are separated by `\author@bx@sep` plus two `\author@bx@sep` margins. This means that each box must be of width (`\textwidth` − `\author@bx@sep`)/N − `\author@bx@sep`, where N is the number of boxes per row.

```
  \author@bx@wd=\textwidth\relax
  \advance\author@bx@wd by -\author@bx@sep\relax
  \ifnum\@ACM@authorsperrow>0\relax
    \divide\author@bx@wd by \@ACM@authorsperrow\relax
  \else
    \ifcase\num@authorgroups
    \relax % 0?
    \or  % 1=one author per row
```

```
    \or  % 2=two authors per row
       \divide\author@bx@wd by \num@authorgroups\relax
    \or  % 3=three authors per row
       \divide\author@bx@wd by \num@authorgroups\relax
    \or  % 4=two authors per row (!)
       \divide\author@bx@wd by 2\relax
    \else % three authors per row
       \divide\author@bx@wd by 3\relax
    \fi
  \fi
  \advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of \addresses:

```
  \gdef\@currentauthors{}%
  \gdef\@currentaffiliation{}%
  \def\@author##1{\ifx\@currentauthors\@empty
    \gdef\@currentauthors{\par##1}%
  \else
    \g@addto@macro\@currentauthors{\par##1}%
  \fi
  \gdef\and{}}%
  \def\email##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{\nolinkurl{##2}}%
  \else
    \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
  \fi}%
  \def\affiliation##1##2{\ifx\@currentaffiliation\@empty
    \gdef\@currentaffiliation{%
      \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
      \setkeys{@ACM@affiliation@}{##1}##2}%
  \else
    \g@addto@macro\@currentaffiliation{\par
      \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
      \setkeys{@ACM@affiliation@}{##1}##2}%
  \fi
  \global\let\and\@typeset@author@bx
}%
```

Actual typesetting is done by the \and macro:

```
  \hsize=\textwidth
  \global\setbox\mktitle@bx=\vbox{\noindent
    \box\mktitle@bx\par\medskip\leavevmode
    \lineskip=1pc\relax\centering\hspace*{-1em}%
    \addresses\let\and\@typeset@author@bx\and\par\bigskip}}
```

\@mkauthors@iv The sigchi-a version. We put authors in the main text with no more than 2 authors per line, unless overriden.

```
\def\@mkauthors@iv{%
```

First, we need to determine the design of the author strip. The boxes are separated by \author@bx@sep plus two \author@bx@sep margins. This means that each box must

be of width (\textwidth − \author@bx@sep)/N − \author@bx@sep, where N is the number of boxes per row.

```
\author@bx@wd=\columnwidth\relax
\advance\author@bx@wd by -\author@bx@sep\relax
\ifnum\@ACM@authorsperrow>0\relax
  \divide\author@bx@wd by \@ACM@authorsperrow\relax
\else
  \ifcase\num@authorgroups
  \relax % 0?
  \or  % 1=one author per row
  \else  % 2=two authors per row
     \divide\author@bx@wd by 2\relax
  \fi
\fi
\advance\author@bx@wd by -\author@bx@sep\relax
```

Now, parsing of \addresses:

```
\gdef\@currentauthors{}%
\gdef\@currentaffiliation{}%
\def\@author##1{\ifx\@currentauthors\@empty
  \gdef\@currentauthors{\par##1}%
\else
  \g@addto@macro\@currentauthors{\par##1}%
\fi
\gdef\and{}}%
\def\email##1##2{\ifx\@currentaffiliation\@empty
  \gdef\@currentaffiliation{\nolinkurl{##2}}%
\else
  \g@addto@macro\@currentaffiliation{\par\nolinkurl{##2}}%
\fi}%
\def\affiliation##1##2{\ifx\@currentaffiliation\@empty
  \gdef\@currentaffiliation{%
    \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
         \setkeys{@ACM@affiliation@}{##1}##2}%
\else
  \g@addto@macro\@currentaffiliation{\par
    \setkeys{@ACM@affiliation@}{obeypunctuation=false}%
    \setkeys{@ACM@affiliation@}{##1}##2}%
\fi
\global\let\and\@typeset@author@bx}%
%
```

Actual typesetting is done by the \and macro

```
   \bgroup\hsize=\columnwidth
   \par\raggedright\leftskip=\z@
   \lineskip=1pc\noindent
   \addresses\let\and\@typeset@author@bx\and\par\bigskip\egroup}
```

\@mkauthorsaddresses Typesetting authors' addresses in the footnote style

```
\def\@mkauthorsaddresses{%
```

```
\ifnum\num@authors>1\relax
Authors' \else Author's \fi
\ifnum\num@authorgroups>1\relax
addresses: \else address: \fi
\bgroup
\def\streetaddress##1{\unskip\@addpunct, ##1}%
\def\postcode##1{\unskip\@addpunct, ##1}%
\def\position##1{\unskip\ignorespaces}%
\def\institution##1{\unskip\@addpunct, ##1}%
\def\city##1{\unskip\@addpunct, ##1}%
\def\state##1{\unskip\@addpunct, ##1}%
\renewcommand\department[2][0]{\unskip\@addpunct, ##2}%
\def\country##1{\unskip\@addpunct, ##1}%
\def\and{\unskip\@addpunct; }%
\def\@author##1{##1}%
\def\email##1##2{\unskip\@addpunct, \nolinkurl{##2}}%
\addresses
\egroup}
```

`\@setaddresses` This is an amsart macro that we do not need.

```
\def\@setaddresses{}
```

`\@authornotemark` Adding a footnote mark to authors. This version adds a "normal" footnote mark.

```
\def\@authornotemark{\g@addto@macro\@currentauthors{\footnotemark\relax}}
```

`\@@authornotemark` Adding a footnote mark to authors with a given number

```
\def\@@authornotemark#1{\g@addto@macro\@currentauthors{\footnotemark[#1]}}
```

`\@mkteasers` Typesetting the teasers

```
\def\@mkteasers{%
  \ifx\@teaserfigures\@empty\else
    \def\@teaser##1{\par\bigskip\bgroup
      \captionsetup{type=figure}##1\egroup\par}
    \global\setbox\mktitle@bx=\vbox{\noindent\box\mktitle@bx\par
    \noindent\@teaserfigures\par\medskip}%
  \fi}
```

`\@mkabstract` Typesetting the abstract

```
\def\@mkabstract{\bgroup
  \ifx\@abstract\@lempty\else
  {\phantomsection\addcontentsline{toc}{section}{Abstract}%
    \if@ACM@journal
       \everypar{\setbox\z@\lastbox\everypar{}}\small
    \else
      \section*{Abstract}%
    \fi
   \ignorespaces\@abstract\par}%
  \fi\egroup}
```

\@mkbibcitation Print the bibcitation format

```
\def\@mkbibcitation{\bgroup
 \def\@pages@word{\ifnum\getrefnumber{TotPages}=1\relax page\else pages\fi}%
 \def\footnotemark{}%
 \def\\{\unskip{} \ignorespaces}%
 \def\footnote{\ClassError{\@classname}{Please do note use footnotes
     inside a \string\title{} or \string\author{} command! Use
     \string\titlenote{} or \string\authornote{} instead!}}%
 \def\@article@string{\ifx\@acmArticle\@empty{\ }\else,
   Article~\@acmArticle\ \fi}%
 \par\medskip\small\noindent{\bfseries ACM Reference Format:}\par\nobreak
 \noindent\authors. \@acmYear. \@title
 \ifx\@subtitle\@empty. \else: \@subtitle. \fi
 \if@ACM@journal
    \textit{\@journalNameShort}
    \@acmVolume, \@acmNumber \@article@string (\@acmPubDate),
    \ref{TotPages}~\@pages@word.
 \else
    In \textit{\@acmBooktitle}%
    \ifx\@acmEditors\@empty\textit{.}\else
      \andify\@acmEditors\textit{, }\@acmEditors~\@editorsAbbrev.%
    \fi\
    ACM, New York, NY, USA%
      \@article@string\unskip, \ref{TotPages}~\@pages@word.
 \fi
 \ifx\@acmDOI\@empty\else\@formatdoi{\@acmDOI}\fi
\par\egroup}
```

\@printendtopmatter End the top matter

```
\def\@printendtopmatter{\par\bigskip}
```

\@setthanks We redefine \setthanks using \long

```
\def\@setthanks{\long\def\thanks##1{\par##1\@addpunct.}\thankses}
```

\@setauthorsaddresses

```
\def\@setauthorsaddresses{\@authorsaddresses\unskip\@addpunct.}
```

3.15 Headers and Footers

We use fancyhdr for our headers and footers:

```
\RequirePackage{fancyhdr}
```

\ACM@linecount@bx This is the box displayed in review mode

```
\if@ACM@review
 \newsavebox{\ACM@linecount@bx}
 \newlength\ACM@linecount@bxht
 \newcount\ACM@linecount
 \ACM@linecount\@ne\relax
 \def\ACM@mk@linecount{%
```

```
    \savebox{\ACM@linecount@bx}[4em][t]{\parbox[t]{4em}{%
        \setlength{\ACM@linecount@bxht}{0pt}%
        \loop{\color{red}\scriptsize\the\ACM@linecount}\\
        \global\advance\ACM@linecount by \@ne
        \addtolength{\ACM@linecount@bxht}{\baselineskip}%
        \ifdim\ACM@linecount@bxht<\textheight\repeat
        {\color{red}\scriptsize\the\ACM@linecount}\hfill
        \global\advance\ACM@linecount by \@ne}}}
\fi
```

`\ACM@linecountL` How to display the box on the left

```
\def\ACM@linecountL{%
  \if@ACM@review
  \ACM@mk@linecount
  \begin{picture}(0,0)%
    \put(-26,-22){\usebox{\ACM@linecount@bx}}%
  \end{picture}%
  \fi}
```

`\ACM@linecountR` How to display the box on the right

```
\def\ACM@linecountR{%
  \if@ACM@review
  \ACM@mk@linecount
  \begin{picture}(0,0)%
    \put(20,-22){\usebox{\ACM@linecount@bx}}%
  \end{picture}%
  \fi}
```

`\ACM@timestamp` The timestamp system

```
\if@ACM@timestamp
  % Subtracting 30 from \time gives us the effect of rounding down despite
  % \numexpr rounding to nearest
  \newcounter{ACM@time@hours}
  \setcounter{ACM@time@hours}{\numexpr (\time - 30) / 60 \relax}
  \newcounter{ACM@time@minutes}
 \setcounter{ACM@time@minutes}{\numexpr \time - \theACM@time@hours * 60 \relax}
  \newcommand\ACM@timestamp{%
    \footnotesize%
    \ifx\@acmSubmissionID\@empty\relax\else
    Submission ID: \@acmSubmissionID.{ }%
    \fi
    \the\year-\two@digits{\the\month}-\two@digits{\the\day}{ }%
    \two@digits{\theACM@time@hours}:\two@digits{\theACM@time@minutes}{. }%
    Page \thepage\ of \@startPage--\pageref*{TotPages}.%
  }
\fi
```

`\@shortauthors` Even if the author redefined `\shortauthors`, we do not print it in the headers when in anonymous mode:

```
\def\@shortauthors{\if@ACM@anonymous Anon.\else\shortauthors\fi}
```

\@headfootfont The font to typeset header and footer text.

```
\def\@headfootfont{\sffamily}
```

standardpagestyle The page style for all pages but the first one

```
\fancypagestyle{standardpagestyle}{%
  \fancyhf{}%
  \renewcommand{\headrulewidth}{\z@}%
  \renewcommand{\footrulewidth}{\z@}%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \fancyhead[LE]{\ACM@linecountL\if@ACM@printfolios\thepage\fi}%
    \fancyhead[RO]{\if@ACM@printfolios\thepage\fi}%
    \fancyhead[RE]{\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL\shorttitle}%
    \fancyfoot[RO,LE]{\footnotesize Manuscript submitted to ACM}%
  \or % acmsmall
   \fancyhead[LE]{\ACM@linecountL\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
   \fancyhead[RO]{\@headfootfont\@acmArticle\if@ACM@printfolios:\thepage\fi}%
    \fancyhead[RE]{\@headfootfont\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
  \or % acmlarge
    \fancyhead[LE]{\ACM@linecountL\@headfootfont
    \@acmArticle\if@ACM@printfolios:\thepage\fi\quad\textbullet\quad\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL}%
    \fancyhead[RO]{\@headfootfont
    \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi}%
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
  \or % acmtog
    \fancyhead[LE]{\ACM@linecountL\@headfootfont
    \@acmArticle\if@ACM@printfolios:\thepage\fi\quad\textbullet\quad\@shortauthors}%
    \fancyhead[LO]{\ACM@linecountL}%
    \fancyhead[RE]{\ACM@linecountR}%
    \fancyhead[RO]{\@headfootfont
    \shorttitle\quad\textbullet\quad\@acmArticle\if@ACM@printfolios:\thepage\fi\ACM@linecountR}%
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date: \@acmPubDate.}%
  \else % Proceedings
    \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
    \fancyhead[LO]{\ACM@linecountL\@headfootfont\shorttitle}%
    \fancyhead[RE]{\@headfootfont\@shortauthors\ACM@linecountR}%
    \fancyhead[LE]{\ACM@linecountL\@headfootfont\acmConference@shortname,
      \acmConference@date, \acmConference@venue}%
    \fancyhead[RO]{\@headfootfont\acmConference@shortname,
      \acmConference@date, \acmConference@venue\ACM@linecountR}%
  \fi
  \if@ACM@sigchiamode
     \fancyheadoffset[L]{\dimexpr(\marginparsep+\marginparwidth)}%
```

```
  \fi
  \if@ACM@timestamp
     \fancyfoot[LO,RE]{\ACM@timestamp}
  \fi
}
\pagestyle{standardpagestyle}
```

\@folio@wd
\@folio@ht
\@folio@voffset
\@folio@max

Folio blob width, height, offsets and max number

```
\newdimen\@folio@wd
\@folio@wd=\z@
\newdimen\@folio@ht
\@folio@ht=\z@
\newdimen\@folio@voffset
\@folio@voffset=\z@
\def\@folio@max{1}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
  \@folio@wd=45.75pt\relax
  \@folio@ht=1.25in\relax
  \@folio@voffset=.2in\relax
  \def\@folio@max{8}
\or % acmlarge
  \@folio@wd=43.25pt\relax
  \@folio@ht=79pt\relax
  \@folio@voffset=.55in\relax
  \def\@folio@max{10}
\fi
```

\@folioblob

The macro to typeset the folio blob.

```
\def\@folioblob{\@tempcnta=0\@acmArticleSeq\relax
  \ifnum\@tempcnta=0\relax\else
```

First, we calculate \@acmArticleSeq modulo \@folio@max

```
  \loop
     \ifnum\@tempcnta>\@folio@max\relax
      \advance\@tempcnta by - \@folio@max
   \repeat
    \advance\@tempcnta by -1\relax
    \@tempdima=\@folio@ht\relax
    \multiply\@tempdima by \the\@tempcnta\relax
    \advance\@tempdima by -\@folio@voffset\relax
    \begin{picture}(0,0)
    \makebox[\z@]{\raisebox{-\@tempdima}{%
        \rlap{%
          \raisebox{-0.45\@folio@ht}[\z@][\z@]{%
            \rule{\@folio@wd}{\@folio@ht}}}%
        \parbox{\@folio@wd}{%
          \centering
          \textcolor{white}{\LARGE\sffamily\bfseries\@acmArticle}}}}
```

```
  \end{picture}\fi
```

firstpagestyle The page style for the first page only.

```
\fancypagestyle{firstpagestyle}{%
  \fancyhf{}%
  \renewcommand{\headrulewidth}{\z@}%
  \renewcommand{\footrulewidth}{\z@}%
  \ifcase\ACM@format@nr
  \relax % manuscript
    \fancyhead[L]{\ACM@linecountL}%
    \fancyfoot[RO,LE]{\if@ACM@printfolios\small\thepage\fi}%
    \fancyfoot[RE,LO]{\footnotesize Manuscript submitted to ACM}%
  \or % acmsmall
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date:
    \@acmPubDate.}%
    \fancyhead[LE]{\ACM@linecountL\@folioblob}%
    \fancyhead[LO]{\ACM@linecountL}%
    \fancyhead[RO]{\@folioblob}%
    \fancyheadoffset[RO,LE]{0.6\@folio@wd}%
  \or % acmlarge
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date:
    \@acmPubDate.}%
    \fancyhead[RO]{\@folioblob}%
    \fancyhead[LE]{\ACM@linecountL\@folioblob}%
    \fancyhead[LO]{\ACM@linecountL}%
    \fancyheadoffset[RO,LE]{1.4\@folio@wd}%
  \or % acmtog
    \fancyfoot[RO,LE]{\footnotesize \@journalName, Vol. \@acmVolume, No.
    \@acmNumber, Article \@acmArticle.  Publication date:
    \@acmPubDate.}%
    \fancyhead[L]{\ACM@linecountL}%
    \fancyhead[R]{\ACM@linecountR}%
  \else % Conference proceedings
    \fancyhead[L]{\ACM@linecountL}%
    \fancyhead[R]{\ACM@linecountR}%
    \fancyfoot[C]{\if@ACM@printfolios\footnotesize\thepage\fi}%
  \fi
  \if@ACM@timestamp
    \ifnum\ACM@format@nr=0\relax % Manuscript
    \fancyfoot[LO,RE]{\ACM@timestamp\quad
      \footnotesize Manuscript submitted to ACM}
    \else
    \fancyfoot[LO,RE]{\ACM@timestamp}
    \fi
  \fi
}
```

\ACM@restore@pagestyle The following code by Ross Moore protects against changes by the totpages package:

```
\let\ACM@ps@plain\ps@plain
\let\ACM@ps@myheadings\ps@myheadings
\let\ACM@ps@headings\ps@headings
\def\ACM@restore@pagestyle{%
  \let\ps@plain\ACM@ps@plain
  \let\ps@myheadings\ACM@ps@myheadings
  \let\ps@headings\ACM@ps@headings}
\AtBeginDocument{\ACM@restore@pagestyle}
```

3.16 Sectioning

Sectioning is different for different levels

```
\renewcommand\section{\@startsection{section}{1}{\z@}%
  {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {.25\baselineskip}%
  {\@secfont}}
\renewcommand\subsection{\@startsection{subsection}{2}{\z@}%
  {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {.25\baselineskip}%
  {\@subsecfont}}
\renewcommand\subsubsection{\@startsection{subsubsection}{3}{10pt}%
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\@subsubsecfont\@adddotafter}}
\renewcommand\paragraph{\@startsection{paragraph}{4}{\parindent}%
  {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
  {-3.5\p@}%
  {\@parfont\@adddotafter}}
\renewcommand\part{\@startsection{part}{9}{\z@}%
  {-10\p@ \@plus -4\p@ \@minus -2\p@}%
  {4\p@}%
  {\@parfont}}
```

\section@raggedright Special version of \raggedright compatible with \MakeUppercase

```
\def\section@raggedright{\@rightskip\@flushglue
  \rightskip\@rightskip
  \leftskip\z@skip
  \parindent\z@}
```

\@secfont Fonts for sections etc. are different for different formats.

\@subsecfont

\@subsubsecfont

\@parfont

```
\def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
\def\@subsecfont{\sffamily\bfseries\section@raggedright}
\def\@subsubsecfont{\sffamily\itshape}
\def\@parfont{\itshape}
\setcounter{secnumdepth}{3}
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
```

```
\or % acmlarge
 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\sffamily\large\section@raggedright}
\or % acmtog
 \def\@secfont{\sffamily\large\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\sffamily\large\section@raggedright}
\or % sigconf
 \def\@secfont{\bfseries\Large\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\bfseries\Large\section@raggedright}
\or % siggraph
 \def\@secfont{\sffamily\bfseries\Large\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\sffamily\bfseries\Large\section@raggedright}
\or % sigplan
 \def\@secfont{\bfseries\Large\section@raggedright}
 \def\@subsecfont{\bfseries\section@raggedright}
 \renewcommand\subsubsection{\@startsection{subsubsection}{3}{\z@}%
   {-.75\baselineskip \@plus -2\p@ \@minus -.2\p@}%
   {.25\baselineskip}%
   {\@subsubsecfont}}
 \def\@subsubsecfont{\bfseries\section@raggedright}
 \renewcommand\paragraph{\@startsection{paragraph}{4}{\z@}%
   {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
   {-3.5\p@}%
   {\@parfont\@addspaceafter}}
 \def\@parfont{\bfseries\itshape}
 \renewcommand\subparagraph{\@startsection{subparagraph}{5}{\z@}%
   {-.5\baselineskip \@plus -2\p@ \@minus -.2\p@}%
   {-3.5\p@}%
   {\@subparfont\@addspaceafter}}
 \def\@subparfont{\itshape}
\or % sigchi
 \setcounter{secnumdepth}{1}
 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\or % sigchi-a
 \setcounter{secnumdepth}{0}
 \def\@secfont{\sffamily\bfseries\section@raggedright\MakeTextUppercase}
 \def\@subsecfont{\sffamily\bfseries\section@raggedright}
\fi
```

`\@adddotafter` Add punctuation after a sectioning command

```
\def\@adddotafter#1{#1\@addpunct{.}}
```

`\@addspaceafter` Add space after a sectioning command

```
\def\@addspaceafter#1{#1\@addpunct{\enspace}}
```

3.17 TOC lists

`\@dotsep` Related to the `\tableofcontents` are all the horizontal fillers. Base LaTeX defines `\@dottedtocline`, which we should not disable. Yet, this command expects `\@dotsep`

to be defined but leaves this to the class implementation. Since amsart does not provide this, we copy the standard variant from article here.

```
\providecommand*\@dotsep{4.5}
```

3.18 Theorems

\@acmplainbodyfont The font to typeset the body of the acmplain theorem style.

```
\def\@acmplainbodyfont{\itshape}
```

\@acmplainindent The amount to indent the acmplain theorem style.

```
\def\@acmplainindent{\parindent}
```

\@acmplainheadfont The font to typeset the head of the acmplain theorem style.

```
\def\@acmplainheadfont{\scshape}
```

\@acmplainnotefont The font to typeset the note of the acmplain theorem style.

```
\def\@acmplainnotefont{\@empty}
```

Customization of the acmplain theorem style:

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@acmplainbodyfont{\itshape}
  \def\@acmplainindent{\z@}
  \def\@acmplainheadfont{\bfseries}
  \def\@acmplainnotefont{\normalfont}
\or % sigchi
\or % sigchi-a
\fi
```

acmplain The acmplain theorem style

```
\newtheoremstyle{acmplain}%
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space above
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space below
  {\@acmplainbodyfont}% body font
  {\@acmplainindent}% indent amount
  {\@acmplainheadfont}% head font
  {.}% punctuation after head
  {.5em}% spacing after head
 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmplainnotefont(#3)}}}% head spec
```

\@acmdefinitionbodyfont The font to typeset the body of the acmdefinition theorem style.

```
\def\@acmdefinitionbodyfont{\normalfont}
```

\@acmdefinitionindent The amount to indent the acmdefinition theorem style.

```
\def\@acmdefinitionindent{\parindent}
```

\@acmdefinitionheadfont The font to typeset the head of the acmdefinition theorem style.

```
\def\@acmdefinitionheadfont{\itshape}
```

\@acmdefinitionnotefont The font to typeset the note of the acmdefinition theorem style.

```
\def\@acmdefinitionnotefont{\@empty}
```

Customization of the acmdefinition theorem style:

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@acmdefinitionbodyfont{\normalfont}
  \def\@acmdefinitionindent{\z@}
  \def\@acmdefinitionheadfont{\bfseries}
  \def\@acmdefinitionnotefont{\normalfont}
\or % sigchi
\or % sigchi-a
\fi
```

acmdefinition The acmdefinition theorem style

```
\newtheoremstyle{acmdefinition}%
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space above
  {.5\baselineskip\@plus.2\baselineskip
    \@minus.2\baselineskip}% space below
  {\@acmdefinitionbodyfont}% body font
  {\@acmdefinitionindent}% indent amount
  {\@acmdefinitionheadfont}% head font
  {.}% punctuation after head
  {.5em}% spacing after head
 {\thmname{#1}\thmnumber{ #2}\thmnote{ {\@acmdefinitionnotefont(#3)}}}% head spec
```

Make acmplain the default theorem style.

```
\theoremstyle{acmplain}
```

Delay defining the theorem environments until after other packages have been loaded. In particular, the cleveref package must be loaded before the theorem environments are defined in order to show the correct environment name (see https://github.com/borisveytsman/acmart/issues/138). The acmthm option is used to

suppress the definition of any theorem environments. Also, to avoid obscure errors arising from these environment definitions conflicting with environments defined by the user or by user-loaded packages, we only define environments that have not yet been defined.

```
\AtEndPreamble{%
  \if@ACM@acmthm
  \theoremstyle{acmplain}
  \@ifundefined{theorem}{%
  \newtheorem{theorem}{Theorem}[section]
  }{}
  \@ifundefined{conjecture}{%
  \newtheorem{conjecture}[theorem]{Conjecture}
  }{}
  \@ifundefined{proposition}{%
  \newtheorem{proposition}[theorem]{Proposition}
  }{}
  \@ifundefined{lemma}{%
  \newtheorem{lemma}[theorem]{Lemma}
  }{}
  \@ifundefined{corollary}{%
  \newtheorem{corollary}[theorem]{Corollary}
  }{}
  \theoremstyle{acmdefinition}
  \@ifundefined{example}{%
  \newtheorem{example}[theorem]{Example}
  }{}
  \@ifundefined{definition}{%
  \newtheorem{definition}[theorem]{Definition}
  }{}
  \fi
  \theoremstyle{acmplain}
}
```

`\@proofnamefont` The font to typeset the proof name.

```
\def\@proofnamefont{\scshape}
```

`\@proofindent` Whether or not to indent proofs.

```
\def\@proofindent{\indent}
```

Customization of the proof environment.

```
\ifcase\ACM@format@nr
\relax % manuscript
\or % acmsmall
\or % acmlarge
\or % acmtog
\or % sigconf
\or % siggraph
\or % sigplan
  \def\@proofnamefont{\itshape}
```

```
  \def\@proofindent{\noindent}
\or % sigchi
\or % sigchi-a
\fi
```

proof We want some customization of the proof environment.

```
\renewenvironment{proof}[1][\proofname]{\par
  \pushQED{\qed}%
  \normalfont \topsep6\p@\@plus6\p@\relax
  \trivlist
  \item[\@proofindent\hskip\labelsep
        {\@proofnamefont #1\@addpunct{.}}]\ignorespaces
}{%
  \popQED\endtrivlist\@endpefalse
}
```

3.19 Acknowledgments

\acks This is a comment-like structure

```
\specialcomment{acks}{%
  \begingroup
  \section*{Acknowledgments}
  \phantomsection\addcontentsline{toc}{section}{Acknowledgments}
}{%
  \endgroup
}
```

\grantsponsor We just typeset the name of the sponsor

```
\def\grantsponsor#1#2#3{#2}
```

\grantnum

```
\newcommand\grantnum[3][]{#3%
  \def\@tempa{#1}\ifx\@tempa\@empty\else\space(\url{#1})\fi}
```

3.20 Conditional typesetting

We use the comment package for conditional typesetting:

```
\AtEndPreamble{%
\if@ACM@screen
  \includecomment{screenonly}
  \excludecomment{printonly}
\else
  \excludecomment{screenonly}
  \includecomment{printonly}
\fi
\if@ACM@anonymous
  \excludecomment{anonsuppress}
  \excludecomment{acks}
```

```
\else
  \includecomment{anonsuppress}
\fi}
```

3.21 Additional bibliography commands

\showeprint The command \showeprint has two arguments: the (optional) prefix and the eprint number. Right now the only prefix we understand is the (lowercase) word 'arxiv' (see http://arxiv.org/hypertex/bibstyles/).

```
\newcommand\showeprint[2][arxiv]{%
  \def\@tempa{#1}%
  \ifx\@tempa\@empty\def\@tempa{arxiv}\fi
  \def\@tempb{arxiv}%
  \ifx\@tempa\@tempb
     arXiv:\href{http://arxiv.org/abs/#2}{#2}\else arXiv:#2%
  \fi}
```

3.22 End of Class

```
\normalsize\normalfont\frenchspacing
```
⟨/class⟩

References

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[5] Carsten Heinz, Brooks Moses, and Jobst Hoffmann. *The Listings Package*, June 2015. http://www.ctan.org/pkg/listings.

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[8] Axel Sommerfeldt. *The subcaption package*, April 2013. http://www.ctan.org/pkg/subcaption.

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[10] Nicola L. C. Talbot. *User Manual for glossaries.sty v4.25*, June 2016. http://www.ctan.org/pkg/subcaption.

[11] David Carlisle. *The textcase package*, October 2004. http://www.ctan.org/pkg/textcase.

Change History

1.48

General: Added prologue option to xcolor 40

Bib code cleanup (Zack Weinberg) 29

Documentation update (siggraph) . 29

1.49

General: New journal: DTRAP 29

v1.00

General: First released version 29

v1.01

General: Changed hyperref colors in screen mode (closes https://github.com/borisveytsman/acmart/issues/1) 29

Defined ACM colors 29

Explicitly put draft option (closes https://github.com/borisveytsman/acmart/issues/4) 32

Set headheight to 1pc for all formats (closes https://github.com/borisveytsman/acmart/issues/5) 29

v1.02

General: Added TOPS and TSC (closes https://github.com/borisveytsman/acmart/issues/12) 29

Documentation changes (closes https://github.com/borisveytsman/acmart/issues/13) 29

v1.03

\@formatdoi: Added macro 64

\if@ACM@authorversion: Added macro 31

\maketitle: Added special case of authorversion 67

General: Added anonsuppress environment 29

Added authorversion option (closes https://github.com/borisveytsman/acmart/issues/9) 29

v1.04

\acmArticleSeq: Name change by Matthew Fluet 58

\acmDOI: Name change by Matthew Fluet 58

\acmISBN: Name change by Matthew Fluet 58

General: Updated bibliography for siggraph 29

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