# 

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#### Abstract

This package provides a class for type setting publications of Association for Computing Machinery.

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### 1 Introduction

Association for Computing Machinery is the world's largest educational and scientific computing society, which delivers resources that advance computing as a science and a profession<sup>1</sup>. It was one of the early adopters of T<sub>F</sub>X for its typesetting.

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

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

The 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 the package.

I am grateful to Matthew Fluet, John Owens, Craig Rodkin, Bernard Rous, David Shamma, Stephen Spencer and many others for their invaluable help.

The development version of the package is available at <a href="https://github.com/borisveytsman/acmart">https://github.com/borisveytsman/acmart</a>.

## 2 User's guide

#### 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 the package uses a number of relatively recent packages, especially the ones related to the fonts.

The latest released version of the 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 making a pull request.

If you decide to install the package yourself, follow the standard rules:

- 1. Run latex on acmart.ins. This will produce the file acmart.cls.
- 2. Put the file acmart.cls and the bibligoraphy files \*.bst to the 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 TFX system for the system-specific details.
- The file acmart.pdf provides the documentation for the package (this is the file you are probably 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.

<sup>1</sup>http://www.acm.org/

The 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
- environ, http://www.ctan.org/pkg/environ
- 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
- latex-tools, http://www.ctan.org/pkg/latex-tools
- *libertine*, http://www.ctan.org/pkg/libertine
- manyfoot, http://www.ctan.org/pkg/manyfoot
- *microtype*, http://www.ctan.org/pkg/microtype
- 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
```

- setspace, http://www.ctan.org/pkg/setspace
- 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

### 2.2 Invocation and options

To use the class put in the preamble of your document

```
\documentclass[\langle options \rangle] \{ 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.

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

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

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, JACM, JDIQ, JEA,
	JERIC, JETC, TAAS, TACCESS, TACO, TALG, TALLIP (formerly
	TALIP), TCPS, TEAC, TECS, 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, TWEB.
acmlarge	Large single column format, used for IMWUT, JOCCH, PACMPL, PO-
	MACS, TAP
acmtog	Large double column format, used for TOG
sigconf	Proceedings format for most of ACM conferences (with the exceptions
	listed below) and all ICPS volumes
siggraph	As of March 2017, this format is no longer used. Please use sigconf
	for SIGGRAPH conferences.
sigplan	Proceedings format for SIGPLAN conferences
sigchi	Proceedings format for SIGCHI conferences
sigchi-a	Format for SIGCHI extended abstract

The option review is useful when combined with the manuscript format option: it provides a version suitable for reviewers and copyeditors.

The option screen may in the future involve additional features suitable for onscreen versions of the articles.

The option natbib is used when the corresponding  $\text{BibT}_{\!E\!}X$  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 process: all author information becomes obscured.

Table 2: Boolean options

Option	Default	Meaning
review	false	A review version: lines are numbered, hyperlinks are colored
screen	false	A screen version: hyperlinks are colored
natbib	true	Whether to use natbib package (see Section 2.10)
anonymous	false	Whether to make author(s) anonymous
authorversion	false	Whether to generate a special version for authors' personal use or posting (see Section 2.3)

#### 2.3 Topmatter commands

A number of commands set up *top matter* information, or, in the computer science jargon, *metadata* for the article. They establish the publication name, article title, authors, doi and other data. Some of these commands, like \title or \author, should be put by the authors. Others, like \acmVolume or \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 the 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.

The class internally loads amsart class, so many top matter commands are inherited from amsart [2].

\acmJournal

The macro  $\armontomath{\armontenant{acmJournal}{\langle shortName\rangle}}$  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}
```

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[ $\langle short\ name \rangle$ ]{ $\langle name \rangle$ }{ $\langle date \rangle$ }{ $\langle venue \rangle$ } 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 *or* the name of the book as set by the editor.

**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}
```

Normally this command is entered either by the editor or by the typesetter.

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

```
\title[\langle ShortTitle \rangle] \{\langle FullTitle \rangle \}
```

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.

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

Abbreviation	Publication			
CIE	ACM Computers in Entertainment			
CSUR	ACM Computing Surveys			
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			
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			
TAC0	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			
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			

\subtitle

Besides title, ACM classes allow subtitle, set with the \subtitle{\subtitle}} macro. The commands for specification of 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 OR-CID, http://www.orcid.org/), \affiliation and \email. In the simplest case you enter them in this order:

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

Do *not* use Lack author deserves his or her own \author command. Note that some formats do not typset e-mails of ORCID identifiers. Do not worry: metadata tools will get them.

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

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

Similarly you can repeat \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, and author  $A_3$  is affiliated with  $I_1$  and  $I_3$ , ...). The recommended solution is to put the \affiliation commands after each author, possibly repeating them:

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

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

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

However, this format is not generally recommended.

\additionalaffiliation

In some cases too many affiliations take too much space. The command  $\additionalaffiliation{\langle affiliation \rangle}$  creates a footnote after author's name with the words "Also with  $\{\langle affiliation \rangle\}$ ". You should use this command only as the 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 the this command you should use \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 old ACM conference formats did not allow for more than six authors and required some efforts from the 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 within JD Inst!
\department{John Doe Institute}
\institution{University of San Serriffe}
\country{San Serriffe}}
```

It is expected that these commands are inserted by the author of the manuscript. Like amsart (and unlike standard LTEX), we allow \thanks only outside of commands

#### \title and \author. Example:

```
\thanks{This work is supported by the Widget Corporation Grant
\#312-001.\\
Author's address: D. Pineo, Kingsbury Hall, 33 Academic Way, Durham,
N.H. 03824; email: dspineo@comcast.net; Colin Ware, Jere A. Chase
Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824; email:
cware@ccom.unh.edu;
Sean Fogarty, (Current address) NASA Ames Research Center, Moffett
Field, California 94035.}
```

\titlenote \subtitlenote \authornote It is expected that this command is inserted by the author of the manuscript.

While the command \thanks generates a note without 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 \footnotes inside \author or \title commands, since this confuses metadata extraction software (actually these commands now produce errors).

\acmVolume \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, including \acmMonth, for example,

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

\acmArticleSeq

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

\acmPrice

The macro  $\acmPrice{\langle price \rangle}$  sets the price for the article (by default 15.00), for example,

```
\acmPrice{25.00}
```

\acmISBN

Book-like volumes have ISBN numbers attached to them. The macro  $\acmISBN(\langle ISBN \rangle)$  sets it. Normally it is set by the typesetter, for example,

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

\acmD0I

The macro  $\acmDOI\{\langle DOI \rangle\}$  sets the DOI number of the article, for example,

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

It is normally set by the typesetter.

\acmBadgeR \acmBadgeL

Some conference articles get special distinction, 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. The class provides commands to add these badges: \acmBadgeR[ $\langle url \rangle$ ]{ $\langle graphics \rangle$ } and \acmBadgeL[ $\langle url \rangle$ ]{ $\langle graphics \rangle$ }. 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 abstract, which puts the badges on the left margin. The argument have the following meaning: [ $\langle url \rangle$ ], if provided, sets the link to the badge authority in the screen version, while { $\langle graphics \rangle$ } 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  $\startPage{\langle page \rangle}$  sets the first page of the article in the journal or book. It is used by the typesetter.

\terms \keywords The macros \terms $\{\langle term, term, ... \rangle\}$  and \keywords $\{\langle keyword, keyword, ... \rangle\}$  set the main terms and the additional keywords for the article. Term and keywords must be separated by commas, for example,

```
\terms{wireless, interference}
\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 the 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 the result like the following:

```
<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>
</cs2012>
\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 need to just 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 ACM: the authors may transfer the rights to ACM, license them to ACM, some or all authors might be employees of the US or Canada Government, etc. Accordingly the command \setcopyright{\ldots\} 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 decision 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 the 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

Table 4: Parameters for \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 ACM (the "traditional" choice).
acmlicensed	The authors retain the copyright but license the publication rights to 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.

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* \maketitle command. Again, this is different from the standard \maketitle.

teaserfigure

A special kind of figure is used for many two-column conference proceedings. 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 may 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}

\received

The command  $\received[\langle stage \rangle] \{\langle date \rangle\}$  sets the history of the publication. The  $[\langle stage \rangle]$  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}
```

Table 5: Settings for \settopmatter command

Parameter	Values	Meaning
printccs printacmref printfolios	true/false	Whether to print CCS categories Whether to print ACM bibliographic entry Whether to print page numbers (folios)

\maketitle

The macro \maketitle must be the last command in the top matter group: i.e., 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 may redefine it if the list of author's name is too long, e.g.,

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

### 2.4 Algorithms

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

## 2.5 Figures and tables

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 the tables *before* the table bodies.
- 2. ACM uses the standard types for figures and types and adds several new ones. In total there are the following types:

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

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

teaserfigure: a special figure before \maketitle.

**sidebar, marginfigure, margintable:** in the sigchi-a format, special sidebars, tables and figures on the margin.

- 3. Accordingly, when scaling the images, one should use the following sizes:
  - (a) For figure in one-column mode, figure\* in two-column mode or teaserfigure—\textwidth (in the one-column you can also use \columnwidth, which coincides with \textwidth in this case).

- (b) For figure in two-column mode—\columnwidth.
- (c) For marginfigure—\marginparwidth.
- (d) For figure\* in SIGCHI Extended abstracts—\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 TeX FAQ [1]. The simplest one is to use \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\\
               & 20m--45m\\
 Radio Range
 \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 abstract extensively uses margin space. The package provides three environments for this with option captions:

sidebar: textual information on the margin

marginfigure: a figure on the margin

margintable: a table on 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 decision. A good way to do so is to put the contents into a \minipage of the width \columnwidth.

#### 2.6 Theorems

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

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

## 2.7 Online-only and offline-only material

printonly
screenonly

Some supplementary material in ACM publication 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}
  This section is included in the online version of the paper.
\end{printonly}
\begin{screenonly}
  (The actual section).
\end{screenonly}
```

We use *comment* package for typesetting this code, so \begin and \end should start at the first positions of the lines of their own (no initial spaces etc.).

### 2.8 Note about anonymous mode

an on suppress

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

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

As for printonly and screenonly environments, \begin{anonsuppress} and \end{anonsuppress} should start the line of their own (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 the anonymous mode this section must be omitted: it gives too much information to the reviewers. Second, the data about the 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 printonly and screenonly environments, \begin{acks} and \end{acls} should start the line of their own (no leading or trailing spaces).

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

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

At present {\langle sponsorID\rangle} is chosen by the authors and can be an arbitrary key, in the same way the label of \cite is arbitrarily chosen. There might be a change to this policy if 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. The 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/youngscientsts]{GS501100001809}{Young
Scientsts' Support Program}.
```

## 2.10 Bibliography

ACM uses the *natbib* package for formatting references and the style ACM-Reference-Format. bst for BibTeX processing. You may disable loading of *natbib* by 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 sitation styles: the authoryear format acmauthoryear or the numeric format acmnumeric using the command \citestyle, for example,

```
\citestyle{acmauthoryear}
```

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

\setcitestyle

You may further customize *natbib* using \setcitestyle command, for example,

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

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 the author-date mode.

There are several customized  $BibT_EX$  entries and fields in ACM style ACM-Reference-Format. bst you may want to be aware of.

The style supports fields doi and url, for example,

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

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

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

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

There are special entries 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 entries you can use the lastaccessed field to add the access date to the URL. There are two ways to enter video and audio sources in the bibliograpy corresponding to two different possibilies. For standalone sources available on WWW you can use an online entry, setting there 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 the sources available as attachments to conference proceedings and similar documents, you can use the usual inproceedings entry, again setting the howpublished field:

```
@Inproceedings{Novak03,
author = "Dave Novak";
              "Solder man",
title =
booktitle = {ACM SIGGRAPH 2003 Video Review on Animation theater
               Program},
               "2003",
year =
publisher = "ACM Press"
address = "New York, NY",
              "4",
pages =
month = "March 21, 2008",
doi = "99.9999/woot07-S422",
howpublished = "Video"
}
```

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

```
@periodical{JCohen96,
  key = "Cohen",
  editor = "Jacques Cohen",
  title = "Special issue: Digital Libraries",
  journal = CACM,
  volume = "39",
  number = "11",
  month = nov,
  year = "1996",
}
```

#### 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, ACMDarkBlue. You can use them in the color assignments.

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 only differ 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 & 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, ACM recommends that you choose sets of colors to help ensure suitable variations in Black & White using either of the following tools:

- 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 and the end of the page) and hyphenation at the end of the page. This is done by 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.

## References

- [1] UK TeX Users Group. UK list of TeX frequently asked questions. http://www.tex.ac.uk, 2016.
- [2] Michael Downes and Barbara Beeton. *The amsart, amsproc, and amsbook document classes.* American Mathematical Society, August 2004. http://www.ctan.org/pkg/amslatex.
- [3] Cristophe Fiorio. algorithm2e.sty—package for algorithms, October 2015.
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- [5] Carsten Heinz, Brooks Moses, and Jobst Hoffmann. *The Listings Package*, June 2015. http://www.ctan.org/pkg/listings.
- [6] Simon Fear. *Publication quality tables in LaTeX*, April 2005. http://www.ctan.org/pkg/booktabs.
- [7] Association for Computing Machinery. ACM Visual Identity Standards, 2007.
- [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.