

SBGN Overview and Status



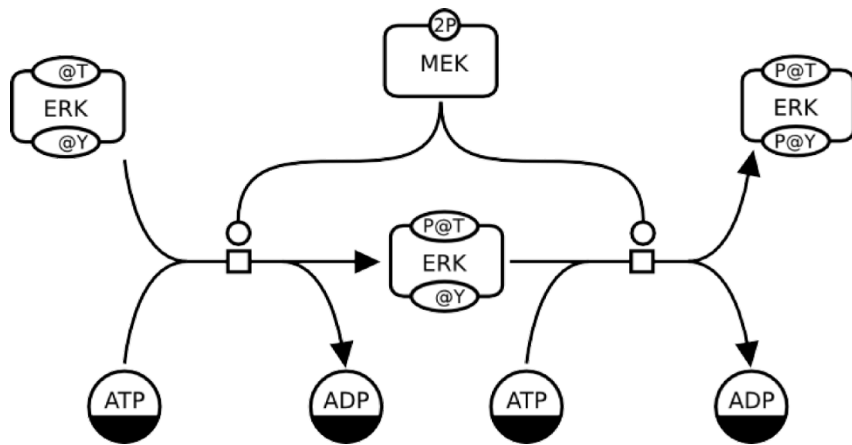
What is SBGN?

- A way to unambiguously describe biochemical and cellular events in graphs
- A graphical representation of quantitative models and biochemical pathways, at different levels of granularity
- Limited amount of symbols (~30) → Smooth learning curve
- Can be translated into executable models, can graphically represent models (e.g. SBML, BioPAX), but can also exist independently
- Three languages
 - Process Descriptions → one state = one glyph
 - Entity Relationships → one entity = one glyph
 - Activity Flow → conceptual level



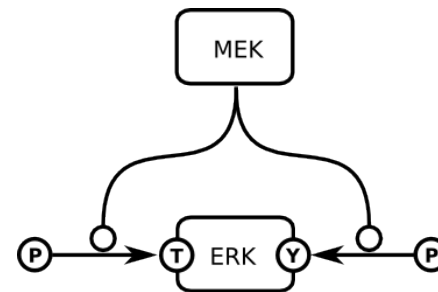
Three Languages in One

Process Description
maps



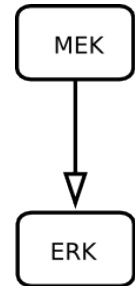
- ▶ Unambiguous
- ▶ Mechanistic
- ▶ Sequential
- ▶ Combinatorial explosion

Entity Relationships
maps



- ▶ Unambiguous
- ▶ Mechanistic
- ▶ Non-Sequential

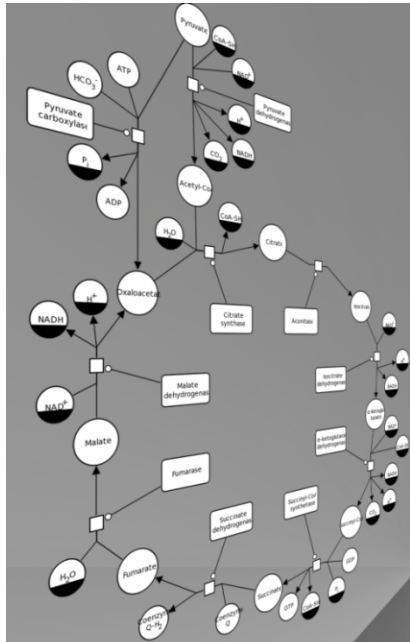
Activity Flow
maps



- ▶ Ambiguous
- ▶ Conceptual
- ▶ Sequential

Three Languages in One

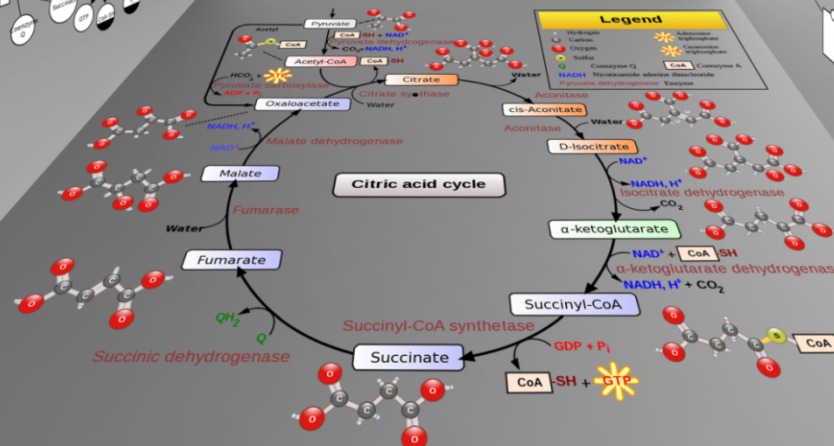
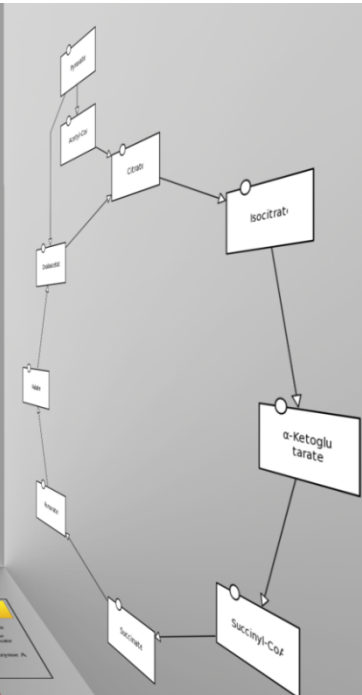
Process Description



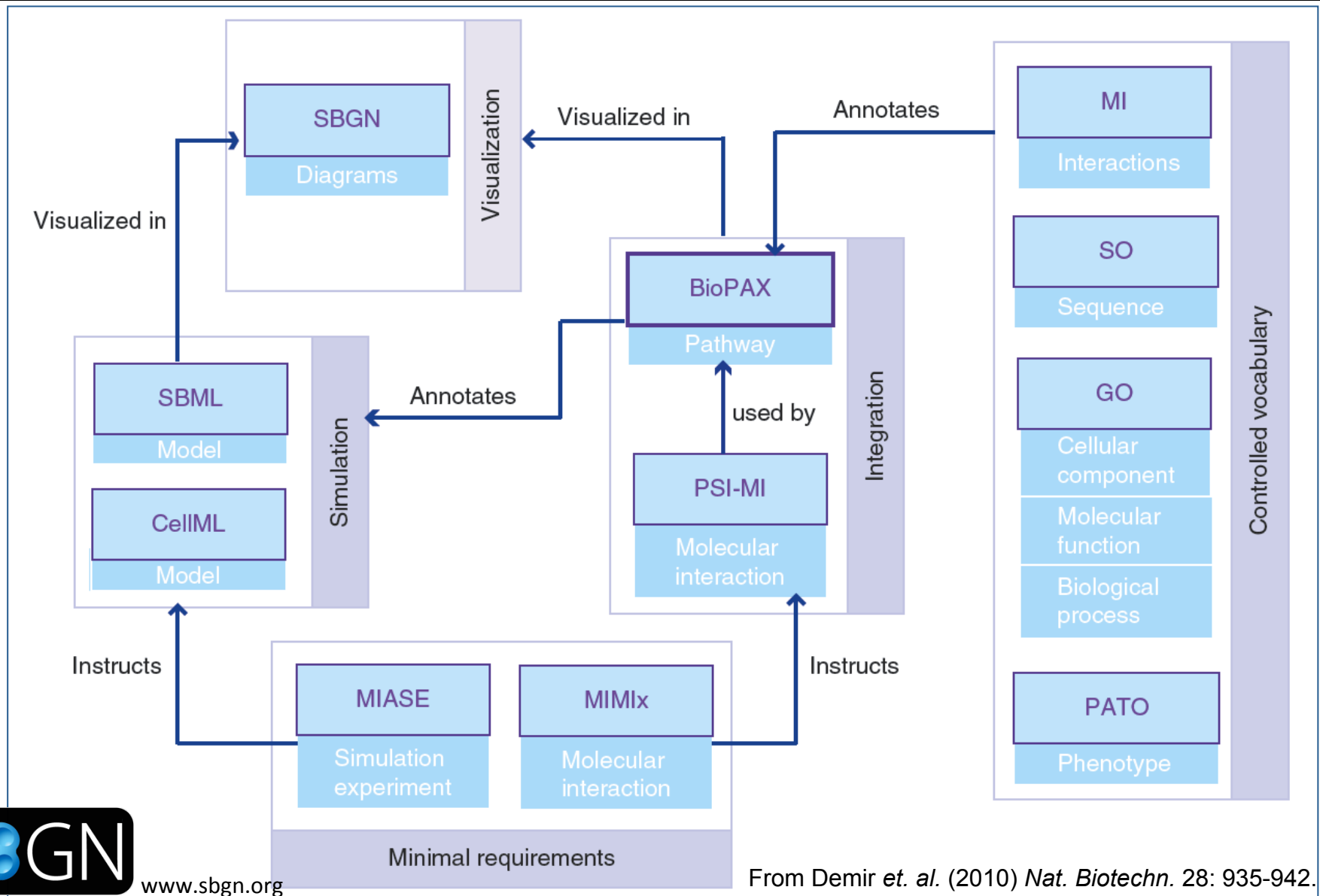
Entity Relationships



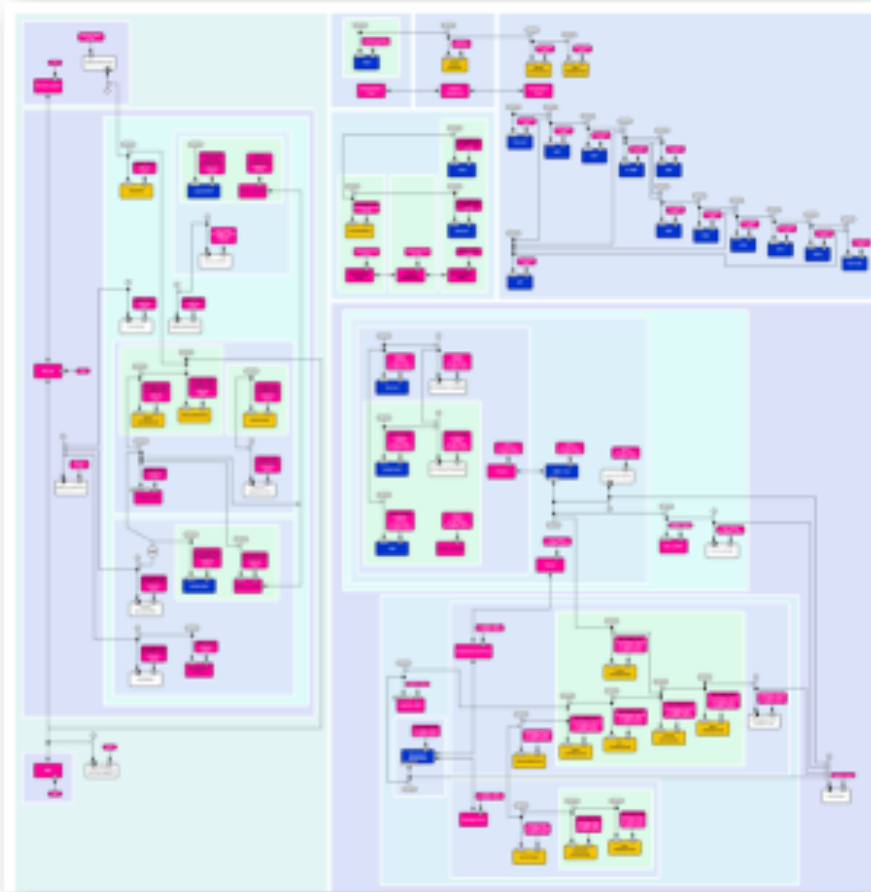
Activity Flow



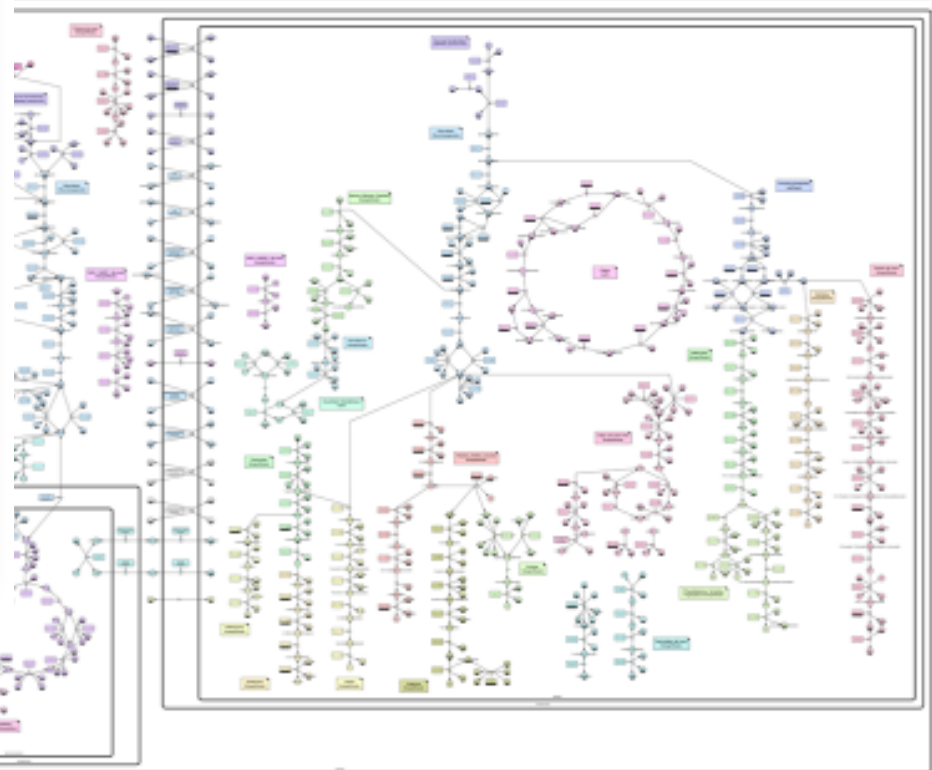
Connection to other Standards



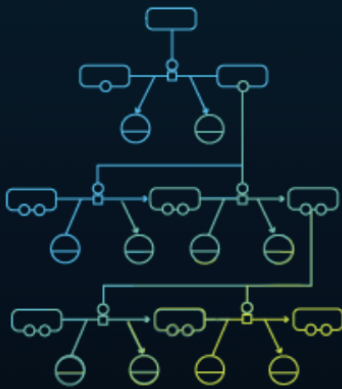
Application Examples



Maps from SBGN best map contests



Web Page



A Visual Notation for Network Diagrams in Biology

Welcome to the global portal for documentation, news, and other information about the **Systems Biology Graphical Notation** (SBGN) project, an effort to standardize the graphical notation used in maps of biological processes.

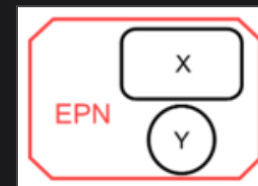
Quick start

[Learn how to use SBGN](#)

[Get involved](#)

Symbol of the month

[Complex \(PD\)](#)



SBGN News

(08 Jul. '14) [SBGN 10](#) will be part of the fifth [COMBINE forum](#), Aug 18-22 in Los Angeles.

Pathway of the month

This month's pathway is an SBGN-PD diagram based on the following paper published in the July issue of the Cell magazine (PubMed ID: [23791384](#)).

Park S., Kukushkin Y., Gupta R., Chen T., Konagai A., Hipp M., Hayer-Hartl M., and Hartl F. (2013) PolyQ Proteins Interfere with Nuclear Degradation of Cytosolic Proteins by Sequestering the Sis1p Chaperone. Cell 154, [134-145](#).

Software

[edit] Software providing support for SBGN

The following is a list of software packages known to provide (or have started to develop) support for SBGN notations. As the list grows, we envision more sophisticated way of recording support, but we hope this will be useful nevertheless. The webpages and e-mail addresses (remove spaces) were correct at the time of recording.

- [Arcadia](#) - Contact: alice.villeger@manchester.ac.uk
- [Athena](#) - Contact: fbergman@u.washington.edu
- [Biological Connection Markup Language \(BCML\)](#) -

Contact: duccio.cavaliere@unifi.it

- [Biographer and jSBGN](#) - Contact: biographer@googlegroups.com
- [BiNoM](#) - Contact: laurence.calzone@curie.fr
- [BIOCHAM](#) - Contact: biocham@inria.fr
- [BioModels Database](#) - Contact: biomodels-net-team@lists.sourceforge.net
- [BioPAX](#) - Contact: demir@cbio.mskcc.org
- [BioUML](#) - Contact: fedor@developmentontheedge.com
- [ByoDyn](#)
- [CellDesigner](#) - Version 4.x supports SBGN Process Diagram Level 1. Contact: info@celldesigner.org
- [CySBGN](#) - A cytoscape plugin. Contact: emanuel@ebi.ac.uk
- [Dunnart](#) - Contact: Sarah.Boyd@infotech.monash.edu.au
- [Edinburgh Pathway Editor](#) - Contact: asorokin@inf.ed.ac.uk or Stuart Moodie smoodie@ed.ac.uk
- [iPathways](#) - Contact: ghosh@sbi.jp
- [IPAVS](#) - Contact: pradeep@cidms.org
- [JWS Online](#) - Contact: jls@sun.ac.za
- [Mayday](#) - Contact: battke@informatik.uni-tuebingen.de
- [Metacrop](#) - Contact: schreibe@ipk-gatersleben.de
- [Netbuilder \(Apostrophe\)](#) - Contact: k.wegner@herts.ac.uk
- [PANTHER](#) - Contact: mi@ai.sri.com

TABLE 1 | Comparison of pathway visualization tools that support SBGN notation.

Name	Ref.	Access	Availability	SBGN			SBGN validation	Mapping	Website export
				PD	ER	AF			
SBGN-ED	9	http://sbgn-ed.org/	F	✓	✓	✓	✓	✓	✓
BiNoM	7	http://bioinfo-out.curie.fr/projects/binom/	F	✓	—	—	—	—	—
BioUML	—	http://www.bioml.org/	F	✓	—	—	—	—	—
CellDesigner	6	http://www.celldesigner.org/	F	✓	—	—	—	✓	—
Edinburgh Pathway Editor (EPE)	12	http://epe.sourceforge.net/	F	✓	✓	✓	—	—	—
PathVisio	8	http://www.pathvisio.org/	F	✓	—	—	—	✓	✓
PathwayLab	—	http://www.innetics.com/	C	✓	—	—	—	—	✓
Arcadia	21	http://arcadiapathways.sourceforge.net/	F	✓	—	—	—	—	—
Athena	22	http://athena.codeplex.com/	F	✓	—	—	—	—	—
BIOCHAM	23	http://contraintes.inria.fr/BIOCHAM/	F	✓	—	—	—	—	—
JWS Online	24	http://jij.biochem.sun.ac.za/help.html	F	✓	—	—	—	—	—
Mayday	25	http://www-ps.informatik.uni-tuebingen.de/mayday/wp/	F	✓	—	—	—	✓	—
Netbuilder'	26	http://strc.herts.ac.uk/bio/maria/Apostrophe/	F	✓	—	—	—	—	—
SBML Layout Library	27	http://sbmllayout.sf.net/	F	✓	—	—	—	—	—
SubtiPathways	28	http://subtiwiki.uni-goettingen.de/subtipathways.html	F	✓	—	—	—	—	—
Systems Biology Metabolic Modeling assistant	29	http://cath.gisum.uma.es:8080/sbmm/	F	✓	—	—	—	—	—
VISIBIOweb	30	http://www.bilkent.edu.tr/~bcbi/pvs.html	F	✓	—	—	—	—	—



Governance

- Editors



Tobias
Czauderna



Huaiyu
Mi



Stuart
Moodie



Falk
Scheiber



Anatoly
Sorokin

– Elected for 3 years, two new editors to be elected end of this year

- Scientific committee



Last meetings

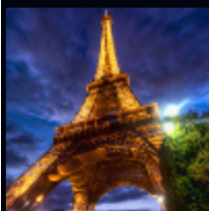
SBGN editor meetings and TelCos

HARMONY 2014

Manchester, UK

22–25 April 2014

SBGN will be part of the fourth [HARMONY hackathon](#).



COMBINE 2013

Paris, France

16–20 September 2013

SBGN was part of the fourth [COMBINE forum](#).



HARMONY 2013

Farmington, USA

20–23 May 2013

SBGN was part of the third [HARMONY hackathon](#).



SBGN 9

Edinburgh, UK

29 Apr – 2 May 2013

This workshop was dedicated to SBGN and it focused on the current SBGN specifications and SBGN's future development.

Documentation Split

- There was a technical specification only
 - Too technical
 - Focused on tool developers
- It was decided to split documentation into two parts
 - Technical Specification: normative official description of the language
 - User Manual: description of the use of language to teach end users
- User Manual is available for SBGN PD

Specification Status Update

- PD Level 1 Version 2 (including user manual) is available for review
 - https://sourceforge.net/p/sbgn/code/HEAD/tree/ProcessDiagram/trunk/Specification/sbgn_PD-level1.pdf
- ER Level 1 Version 2 is available for review
 - https://sourceforge.net/p/sbgn/code/HEAD/tree/EntityRelationship/trunk/sbgn_ER-level1.pdf
- AF Level Version 1.1 is available for review
 - https://sourceforge.net/p/sbgn/code/HEAD/tree/ActivityFlow/trunk/sbgn_AF-level1.pdf

Topics of this Meeting (Issues to discuss)

- PD Specification L1V2
- AF Specification L1V2
- ER Specification L1V2
- Mappings of SBGN to other languages (to BioPAX, SBML, ...)
- SBGN and databases (Reactome, Panther, BioModelsDB, ...)
- LEGO and SBGN-AF
- SBGN and SBOL Visual
- Developments for level 2 (PD, ER, AF)
- libSBGN and SBGN-ML
- Software (SBGN-ED, ...)
- Teaching and Outreach
- Housekeeping (funding, SBGN competition, editor election, next meeting, ...)

