

ISMB/ECCB 2009 Stockholm

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ABSTRACT

The International Society for Computational Biology (ISCB; <http://www.iscb.org>) presents the Seventeenth Annual International Conference on Intelligent Systems for Molecular Biology (ISMB), organized jointly with the Eighth Annual European Conference on Computational Biology (ECCB; <http://bioinf.mpi-inf.mpg.de/conferences/eccb/eccb.htm>), in Stockholm, Sweden, 27 June to 2 July 2009. The organizers are putting the finishing touches on the year's premier computational biology conference, with an expected attendance of 1400 computer scientists, mathematicians, statisticians, biologists and scientists from other disciplines related to and reliant on this multi-disciplinary science. ISMB/ECCB 2009 (<http://www.iscb.org/ismbeccb2009/>) follows the framework introduced at the ISMB/ECCB 2007 (<http://www.iscb.org/ismbeccb2007/>) in Vienna, and further refined at the ISMB 2008 (<http://www.iscb.org/ismb2008/>) in Toronto; a framework developed to specifically encourage increased participation from often under-represented disciplines at conferences on computational biology. During the main ISMB conference dates of 29 June to 2 July, keynote talks from highly regarded scientists, including ISCB Award winners, are the featured presentations that bring all attendees together twice a day. The remainder of each day offers a carefully balanced selection of parallel sessions to choose from: proceedings papers, special sessions on emerging topics, highlights of the past year's published research, special interest group meetings, technology demonstrations, workshops and several unique sessions of value to the broad audience of students, faculty and industry researchers. Several hundred posters displayed for the duration of the conference has become a standard of the ISMB and ECCB conference series, and an extensive commercial exhibition showcases the latest bioinformatics publications, software, hardware and services available on the market today. The main conference is preceded by 2 days of Special Interest Group (SIG) and Satellite meetings running in parallel to the fifth Student Council Symposium on 27 June, and in parallel to Tutorials on 28 June. All scientific sessions take place at the Stockholmssmässan/Stockholm International Fairs conference and exposition facility.

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1 INTRODUCTION

Over the years the ISMB conference has provided a forum for the presentation of research and the exchange of novel and emerging methods of investigation for many thousands of bioinformaticians and computational biologists from around the world. Five years after the first ISMB, the International Society for

Computational Biology (<http://www.iscb.org>) was formed to take over the organization, maintain the institutional memory of ISMB and expand the informational resources available to members of the bioinformatics community. The launch of ECCB (<http://bioinf.mpi-inf.mpg.de/conferences/eccb/eccb.htm>) 8 years ago provided for a focus on European research activities in years when ISMB is held outside of Europe, and a partnership of conference organizing efforts for the presentation of a single international event when the ISMB meeting takes place in Europe every other year.

The multidisciplinary field of bioinformatics/computational biology has matured since gaining widespread recognition in the early days of genomics research. Since the well-documented race to map the human genome in the 1990s, technological advances have increased our ability to study living systems through computation at an impressive rate. Today there are a multitude of specialized, topically focused meetings and an ever-increasing number of broad-based regional and international conferences modeled largely or loosely after ISMB. Yet, ISMB, or ISMB/ECCB when presented jointly, continues to draw a remarkable segment of scientists, from leaders in the field to enthusiastic students, to engage in up to a week of intensive presentations, interactive discussions and networking activities. For many students this conference serves as their introduction to a large, international, scientific conference and they will return throughout their careers. For those of us who have made this our conference of choice since its inception, with each return we look forward to renewing connections—some made at our first ISMB—and establishing new ones that might last throughout the remainder of our careers.

As this is the annual meeting of the ISCB, members save significantly on *ISMB/ECCB 2009 Registration* (<http://www.iscb.org/ismbeccb2009/registration.php>) fees. Non-members have the option to join during registration to take advantage of those same great savings, or can accept a complimentary 1-year-membership as part of their higher non-member fees. The connection to a professional society dedicated to computational biology gives ISCB members additional opportunities to participate and contribute to our scientific community beyond this annual conference event.

2 THE PARALLEL PARADIGM

ISMB/ECCB 2009 is made up of a selection of harmonized parallel tracks that enable each attendee to achieve the utmost from their conference experience (Table 1). Since the beginning and at its core, the conference presents keynote speakers who are preeminent scientists of the field, and peer-reviewed original research papers that demonstrate a significant computational method or tool with real biological results; these papers are presented orally and published as the conference proceedings. Parallelism was first tried at ISMB 2002 in Edmonton, Canada, where software demonstrations were held in

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parallel to the proceedings papers track. At ISMB 2003 in Brisbane, Australia, the addition of a second parallel track of papers further expanded the conference program. By adding the parallel papers track the organizers were able to accommodate the ever-increasing submissions of high quality research. It was in this period that ECCB 2002 was launched in a single-track format, which it continues as its norm when not coordinated jointly with ISMB.

At ISMB 2006 in Fortaleza, Brazil, another new track was organized for the oral presentation of a selection of submitted abstracts. The following year ISMB/ECCB 2007 effectively doubled the breadth of the conference with the introduction of three new opportunities for oral presentation: highlights of important papers recently published in refereed journals; special sessions on hot and emerging topics on the periphery of computational biology; and industry presentations featuring scientific advances within the commercial sector. Meanwhile, a robust and vibrant poster session has been a long-standing tradition of this conference series, enabling all attendees the opportunity to share their research with all other attendees, and cultivate the personal connections that only attendance at a live event can achieve.

The impetus for introducing each new track to the conference schedule was and remains a means of accommodating the many divergent needs of our multi-disciplinary scientific community. For example, computer scientists traditionally publish in conference proceedings, whereas biologists do not. By initially requiring that all presentations be tied to papers for publication, little opportunity existed for biologists to fully participate in the conference. The introduction of oral abstracts, which eventually led to the creation of the Highlights Track, along with the addition of a Special Sessions Track, have eliminated that barrier and paved the way for a more balanced presentation of the multi-faceted discipline of computational biology. Likewise, each stage in a scientist's career lends itself to the progression of presentation options at the conference. For instance, students and junior scientists will most often submit a Poster abstract of unpublished work at their first ISMB; more established junior and senior investigators might submit research results to the Proceedings Papers Track for the opportunity to orally present their research to the full conference audience; authors (computer scientists and biologists alike) of work published within the previous 18 months that is on track to becoming a high-impact highlight within their field of research are encouraged to submit to the Highlights Track; whereas innovators forging the most novel areas of research are sought out to present a mini-symposium in the Special Sessions Track; and, of course, the highly regarded scientists whose work has set a standard or made important discoveries are invited to present a Keynote lecture. The Technology Track typically features software and hardware demonstrations from scientists at every level of career development, as well as from individual researchers, full research groups within an institution and regional or international institutes of bioinformatics investigation.

3 2009 KEYNOTE SPEAKERS

Presented in a single track without competing parallel sessions, the twice-daily *Keynote Presentations* (<http://www.iscb.org/ismbecb2009/keynotes.php>) typically attract all conference participants and fill the plenary hall to capacity. In Stockholm we continue the custom of exposing the ISMB/ECCB audience to contrasting and complimentary perspectives from both the

computational and the experimental biology camps. This year's keynote speakers are poised to inspire attendees with stories of their intended and sometimes unintended roads to real-world biological research results.

Two keynote presentations are delivered annually by the recipients of the ISCB awards: the Overton Prize, in memory of G. Christian Overton, an ISCB board member who died suddenly in 2000, is awarded to an outstanding investigator in the early-to middle-stage of his or her career, and the Accomplishment by a Senior Scientist Award honors the body of work of one who has made major contributions to the field of computational biology through research, education, service, or a combination of the three over the course of a successful career. The ISCB 2009 Overton Prize goes to Trey Ideker (University of California, San Diego, USA), and the ISCB 2009 Accomplishment by a Senior Scientist Award honors Webb Miller (Pennsylvania State University, USA). The award presentations are made following keynote lectures by each of these exceptional scientists. The six additional keynote presenters for 2009 are: Pierre-Henri Gouyon (National Museum of Natural History, Paris, France); Daphne Koller (Stanford University, Stanford, USA); Thomas Lengauer (Max-Planck Institute for Informatics, Saarbrücken, Germany); Eugenia María del Pino Veintimilla (Pontifical Catholic University of Ecuador, Quito, Ecuador); Tomaso A. Poggio (Massachusetts Institute of Technology, Cambridge, USA); and Mathias Uhlen (Royal Institute of Technology, Stockholm, Sweden). These preeminent scientists will discuss research in such distinct areas as evolution, machine learning, computational drug treatment regimes, embryonic development, computational neuroscience and proteomics.

4 PROCEEDINGS PAPERS

In addition to keynote speakers, original research papers published as a Conference Proceedings have been a mainstay of the ISMB and ECCB conference series. The proceedings of these conferences are published by Oxford Journals in an open access, online section of the journal *Bioinformatics*, which is fully indexed by PubMed and by the Institute of Scientific Information (ISI). Two hundred forty two papers were submitted to the ISMB/ECCB 2009 Proceedings Track, with Dan Gusfield (University of California, Davis, USA) and Anna Tramontano (University of Rome 'La Sapienza', Italy), serving as chair and co-chair, respectively. Together with 21 Area Chairs and well over 300 reviewers, these Proceedings Track chairs led a scientific journal-level process of rigorous review to select 46 (19%) papers for oral presentation in Stockholm and publication in the Proceedings.

A positive change to the review procedure from years past was the scheduling and implementation of a conditional acceptance pending reviewer suggested revisions. For ISMB 2008 a small test was run by the Proceedings Track chairs to determine the effectiveness of a conditional acceptance in raising the overall acceptance rate and improving the quality of published papers. That limited test proved successful, and this now appears to be a step that can be replicated in future years.

5 SPECIAL SESSIONS

Now in its third year at ISMB, including a second appearance at a joint ISMB/ECCB conference, the *Special Sessions Track*

(http://www.iscb.org/ismbecb2009/special_sessions.php) will introduce our scientific community to highly relevant emerging issues and hot topics that are typically not within the focus of an ISMB or ECCB meeting. The Special Sessions committee, chaired by Michal Linial (Hebrew University of Jerusalem, Israel) accepted six proposals for presentation on topics of genomic epidemiology, orthology inference, membrane proteins, eQTL systems-level insight, regulatory architecture in human disease, and the latest advances and challenges in computational biology. Three of the six Special Sessions are being organized by groups from Sweden: Juni Palmgren (Karolinska Institutet and Stockholm University) leads a session on genomic epidemiology to illustrate how modern tools of life sciences technology are applied to the understanding of disease mechanisms in the study of a regionalized Nordic human population group; Erik Sonnhammer (Stockholm Bioinformatics Centre) conducts a session focused on orthology inference to stimulate and build an understanding of needed standards for orthology data sets; and Gunnar von Heijne (Stockholm University and Honorary Conference Chair) organizes a session to capture the recent excitement of the role of membrane proteins in modern-day drug discovery targets.

6 HIGHLIGHTS TRACK

The *Highlights Track* (<http://www.iscb.org/ismb2008/highlights.php>) was introduced at ISMB/ECCB 2007 in Vienna by Burkhard Rost (Columbia University, New York, USA), who continues to serve as its chair. This track was immediately rated as one of the best new features of the conference due to the high quality of the presented works and the ways in which they helped expand the scope of topics covered in the conference. The initial 2009 call for high-impact, important work that has been published since January 2008 resulted in 163 Highlights Track proposals, from which a group of area experts accepted 62 for presentation in Stockholm. In all, 29 journals were cited among these accepted submissions, including *Bioinformatics* (five papers), and such high-impact publications as *Science* (two papers) and *Nature* (three papers).

7 TECHNOLOGY TRACK

Early on ISMB introduced a valuable Demonstrations Track for labs and institutions to reveal the usefulness of their software to the receptive ISMB audience. Over time the ‘demos’ became highly popular and evolved right along with the growing needs of our community. Following a 2008 name change to more accurately reflect the options for presenting software or hardware as demonstrations or hands-on mini-workshops, the *Technology Track* (<http://www.iscb.org/ismbecb2009/techtrack.php>) returns for 2009 with Rodrigo Lopez (EBI, Hinxton, England) as its chair for the second time.

8 WORKSHOPS

In recent years ISMB has made room for sessions that do not have a natural home in any of the named conference tracks. By doing so, groups of attendees that share a common mission are able to meet face-to-face to review past efforts and continue to work together toward achieving stated goals. There are two such sessions in 2009 that fall into this *Workshop Track*

(<http://www.iscb.org/ismbecb2009/workshops.php>) the Workshop on Education in Bioinformatics (WEB 09), which first met at ISMB 2001 in Copenhagen and the Bioinformatics Core Facilities working group that had its start at ISMB 2002 in Edmonton.

9 POSTERS

With several hundred *Posters* (<http://www.iscb.org/ismbecb2009/posters.php>) submitted to ISMB/ECCB, the ISCB site selection team specifically searches for conference and convention facilities that can accommodate all posters on display for the duration of the conference. By selecting Stockholmsmässan/Stockholm International Fairs as the 2009 conference venue this goal has been achieved for the third year running. The capacity to display all accepted posters all the time adds value for poster authors and non-authors alike; it affords attendees the time necessary to visit posters of interest to them at times that are most convenient, and it presents the authors’ research continuously, well beyond the designated author presentation sessions. Marco Punta (Columbia University, New York, USA) is chairing the selection of posters in Stockholm, as he has for the previous two ISMB conferences.

10 ART & SCIENCE EXHIBITION

Many people feel a strong connection to the artistic beauty of science, and the *Art & Science Exhibition* (<http://www.iscb.org/ismbecb2009/artandscience.php>) speaks directly to them by showcasing a collection of creative, visually appealing and emotionally inspired images and videos submitted by conference attendees. This unique addition to ISMB 2008, organized by the Student Council and chaired by Milana Frenkel-Morgenstern (Weizmann Institute of Science, Rehovot, Israel), was so popular it created quite a buzz and mesmerized many an ISMB attendee. The images displayed in Toronto were brought to Sardinia for the ECCB 2008 audience to enjoy. For 2009, with Milana’s continued organizational skills, a completely new collection of images are displayed for all to enjoy.

11 VENDOR EXHIBITION

Many valuable tools, products, services and publications are available to the computational biologist, and the *ISMB/ECCB Exhibition* (<http://www.iscb.org/ismbecb2009/floorplan.php>) features a wide variety from commercial vendors, non-profit institutions and conference sponsors alike. The exhibition area in Stockholm is intentionally situated at the crossroads to the various conference tracks, and therefore is as much a place to meet vendors and learn about the latest and greatest of computational products, as it is a natural meeting point for colleagues and collaborators.

12 PRE-CONFERENCE SIGS, STUDENT COUNCIL SYMPOSIUM AND TUTORIALS

The main conference tracks officially open on June 29, but in actuality many key educational activities get underway 2 days earlier. One- and two-day Satellite and Special Interest Group Meetings take place 27–28 June, the 5th Annual ISCB Student Council Symposium (SCS5) will be presented on 27 June, and a slate of ten Tutorials are offered on 28 June. By the time of the opening

plenary session of the main conference, ~50% of all attendees will have already participated in one or more of these instrumental pre-conference learning options.

Hershel Safer (Dynamix Pharmaceuticals Ltd, Nes Ziona, Israel) continues his long affiliation with the Satellite and Special Interest Group Meetings (SIGs; <http://www.iscb.org/ismbeccb2009/sigs.php>) that started several years ago when he chaired the ISCB Conferences Committee. In 2007 Hershel developed and implemented the procedure for selecting submitted SIG proposals for presentation both prior to and in parallel with the main conference, and has since served as an effective chair of the committee that reviews SIG proposals. In 2009, one Satellite Meeting and eight SIGs will be presented. The 2-day pre-conference satellite meeting is: *3Dsig: structural bioinformatics & computational biophysics*, and the 2-day pre-conference SIGs are *Alternative splicing (AS-SIG)*, *Bioinformatics open source conference (BOSC)* and *BioPathways (all will be held on 27–28 June)*. The 1-day SIG meetings to be held on 27 June are: *DAM: Data and analysis management* and *M3: Metagenomics, metadata and metaanalysis* and the 1-day SIG meetings on 28 June are: *Bio-ontologies* and *Short-SIG: Next generation sequencing*. An additional 2-day SIG straddles the last of the pre-conference days and the first of the main conference days: *BioLink: Linking literature, information and knowledge for biology*. Although SIGs traditionally command a registration fee, the BioLink SIG opens its doors the afternoon of its second day to all ISMB/ECCB 2009 attendees for a 2 hours session that explores the future of scientific publishing with regard to the impact of extraction methods of text, images and figures in publications.

In parallel to the first day of SIGs will be the *5th ISCB Student Council Symposium (SCS5)*; <http://www.symposium.iscb.org>) on 27 June, chaired by Lucia Peixoto (University of Pennsylvania, Philadelphia, USA) and co-chaired by Jeroen de Ridder (The Netherlands Cancer Institute, Amsterdam, The Netherlands). In addition to an excellent slate of keynote presenters and panelists, this student-led event includes a selection of submitted student abstracts accepted for oral presentation, a poster reception, sponsored awards and travel fellowships.

The perfect follow up to the SCS5 is the *Tutorials* (<http://www.iscb.org/ismbeccb2009/tutorials.php>) being offered the very next day. Janet Kelso (MPI for Evolutionary Anthropology,

Leipzig, Germany) and Fran Lewitter (The Whitehead Institute, Cambridge, USA) are once again serving as Chair and Co-Chair, respectively, for this essential offering of ISMB and ECCB pre-conference learning. The successful trial of positioning Tutorials in parallel to the second day of pre-conference SIGs has landed these educational options on 28 July. Five options are available in the morning and five in the afternoon for a total portfolio of ten distinct Tutorial titles.

These pre-conference meetings, symposium and tutorials each offer a unique opportunity to examine a specialty area or get a head start on an ever-important and irreplaceable feature of attending a conference: networking with peers of similar research interests and establishing relationships that can be of immeasurable benefit throughout the lifetime of a scientific career.

13 STOCKHOLM AS A DESTINATION

Since announcing Stockholm as the host city of this 2009 conference, excitement has been building. With the conference starting just one week after the summer solstice and amid Sweden's season of midsummer festivals, this is a most inviting season to visit Scandinavia. Everyone involved in organizing ISMB/ECCB 2009 shares in the excitement, and our local organizers are preparing lists of where to find the best bargains in dining, shopping and activities. Stockholm has a reputation for being expensive, but it is really quite affordable if one is willing to bypass the trendier hot spots and find the gems of great food featured at very affordable prices. And for those traveling with family or friends for a pre- or post-conference adventure, Stockholm is an excellent jumping off point to the entire Scandinavian and Baltic regions, as well as northern Europe.

With the ISMB/ECCB 2009 scientific agenda filled with great science from morning to night, destination oriented activities are a must. We thank the city leaders of Stockholm for hosting this year's opening reception in the beautiful ballroom of the *City Hall of Stockholm* (<http://www.stockholm.se/cityhall>), home of the yearly Nobel Banquet. For the final night offsite dinner reception we have hired out the entire *Vasa Museum* (<http://www.vasamuseet.se/InEnglish/about.aspx>), a purpose-built structure housing the world's only surviving 17th century warship. From start to finish we are venturing out into Stockholm's greatest attractions to be sure all attendees have a chance to enjoy and appreciate this city's worldwide appeal.

Table 1. ISMB and ISMB/ECCB historical data

Year	Location	Attendees	Keynotes	Papers accepted	Papers submitted	Highlight accepted	Highlight submitted	Special sessions	Posters accepted	Tutorials	Special interest groups
1999	Heidelberg, Germany	655	8	34	91				139	10	2
2000	San Diego, USA	1272	7	42	141				275	14	1
2001	Copenhagen, Denmark	1251	6	38	180				345	14	6
2002	Edmonton, Canada	1624	8	42	207				494	15	6
2003	Brisbane, Australia	927	8	48	342				414	16	5
2004	Glasgow, UK ^a	2136	8	67	496				952	14	8
2005	Detroit, USA	1731	8	56	426				622	14	8
2006	Fortaleza, Brazil	880	8	67	407				556	12	4
2007	Vienna, Austria ^a	1752	10	63	418	63	215	7	1096	14	8
2008	Toronto, Canada	1395	8	48	287	61	189	8	692	10	9
2009	Stockholm, Sweden	1400 ^b	8	46	242	62	163	6		10	9

^aMeetings organized jointly by ISCB and ECCB.

^bAnticipated attendance.