ISMB 2008 Toronto

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The International Society for Computational Biology (ISCB) presents the Sixteenth International Conference on Intelligent Systems for Molecular Biology (ISMB 2008), to be held in Toronto, Canada, July 19–23, 2008. Now in its 16th year, ISMB has become a major outlet for computational biology globally, its flagship conference organizing the ISMB conference series (http://www.iscb.org/). ISCB has been founded on Computational Biology (ECCB) to organize a joint meeting in Europe every other year. This led to the ISMB/ECCB 2007 (http://www.iscb.org/ismbecb2007/) in Vienna in the attempt to specifically encourage increased participation from previously under-represented cultures together. However, this approach is offering a way to bring these two publication mediums together. The first day (July 18) of the meeting is reserved for two-day Special Interest Group (SIG) and Satellite meetings, the second day (July 19) runs SIGs for the first time in parallel with Tutorials and the Student Council Symposium, and for the first time two SIGs are running in parallel with the main ISMB meeting (July 20–23).

Introduction

A considerable fraction of all the major scholars in computational biology frequently participate in ISMB. Consistent with this leading role in representation, ISMB has become a major outlet for increasing the visibility of this extremely dynamic new discipline, and for maintaining and elevating its scientific standards. It has become the vehicle for the education of scholars at all stages of their careers, for the integration of students, and for the support of young leaders in the field. ISMB has also become a forum for reviewing the state of the art in the many fields of this growing discipline, for introducing new directions, and for announcing technological breakthroughs.

ISMB and ISCB are contributing to the advance of biology, and to helping to build bridges and understanding between dedicated and passionate groups of scholars from an unusual variety of backgrounds.

ISMB 1993–2008. The ISMB conference series began in 1993, the result of the vision of David Searls (GlaxoSmithKline), Jude Shavlik (University of Wisconsin Madison), and Larry Hunter (University of Colorado). A few years later, ISMB had established itself as a primary event for the computational biology community and triggered the founding of ISCB, the International Society for Computational Biology (http://www.iscb.org/). ISCB has been organizing the ISMB conference series since 1998. While ISCB evolved into the only society representing computational biology globally, its flagship conference has become the largest annual worldwide forum focused on computational biology.

In January 2007, the ISCB came to an agreement with the European Conference on Computational Biology (ECCB) to organize a joint meeting in Europe every other year. This led to the ISMB/ECCB in Vienna in 2007 that set the standard for a large-scale integrative forum for all those with interest in subjects related to computational biology.

ISCB is now focusing on expanding participation beyond North America and Europe, which has accounted for the majority of participants during the history of ISMB. One meeting in South Asia (ISMB 2008), to be held in Toronto, Canada, July 19–23, 2008. Now in its 16th year, ISMB has become a major outlet for computational biology globally, its flagship conference organizing the ISMB conference series (http://www.iscb.org/). ISCB has been founded on Computational Biology (ECCB) to organize a joint meeting in Europe every other year. This led to the ISMB/ECCB in Vienna in 2007 that set the standard for a large-scale integrative forum for all those with interest in subjects related to computational biology.

ISCB is now focusing on expanding participation beyond North America and Europe, which has accounted for the majority of participants during the history of ISMB. One meeting in South Asia (ISMB 2008) has already been sponsored by ISCB, and another one in North Asia is going to follow. ISMB itself has also been held in Australia (2003) and Brazil (2006).

Multi-tracking in response to challenges posed by merging fields. ISMB/ECCB 2007 considerably expanded the breadth of the meeting. ISMB 2008 in Toronto builds on its successful predecessor by keeping what worked, and by providing more open time for spontaneous exchange and meetings. The main goal of ISMB is to contribute toward the success and enjoyment of science. In fact, scientific process is highly dependent on good communication of results and nascent ideas. Creating outlets for such communication is therefore an important catalyst for the advancement of computational biology.

The major challenge for this interdisciplinary field is that two cultures with very different ways of publishing intersect. On the one hand, computational sciences publish their most important results in rigorously reviewed proceedings of meetings; the lower the ratio between accepted/submitted papers, the more valued the publication. Publications in conference proceedings are often more highly regarded than those in peer-reviewed scientific journals. In contrast, the life sciences publish their best work in peer-reviewed journals with the highest possible impact; journals with higher impact are ranked higher, and publications are not coupled to presentations at any meeting. Open access publications attach value to the individual publication rather than to the specific vehicle. Thus, they may ultimately offer a way to bring these two publication cultures together. However, this approach...
does not address the needs of all members of a Society rooted firmly in both cultures.

Accepting this complex challenge already implies the need for at least four parallel tracks: two for presentations from proceedings (Proceedings Tracks), two for presentations from high-profile work published in refereed journals (Highlights Tracks). Further expansion may offer even greater opportunities to include new and relevant areas of research into the scientific program.

Events in light of a scientific career. One way of drawing the dividing line between the multiple events (Figure 1) is with respect to the stage of the participant in their scientific career. Young participants (students, postdocs, and young faculty) typically present Posters that may combine published and unpublished material and may represent very recent work. If the work has matured to the publication stage, the investigator may consider submitting to the Proceedings Track for novel, original research work. (We note that the acceptance rate is typically below 17%, i.e., more restrictive than most peer-reviewed journals and most computer science conferences). Most papers accepted in past ISMB proceedings were by investigators who were already established in the community. Published work with a track record of being a highlight in the field finds a home in the Highlights Track. One of the selection criteria for a Highlights talk is that the designated presenter has strong presentation skills. Thus, most presenters are already well-known in the community. An important body of work is typically the prerequisite for invitation for a Keynote Presentation by an accomplished researcher. Finally, the Special Sessions are ways to expose the field to areas and novelties that are not already integrated into the community. The extension of what was previously a track for software demonstrations to a more inclusive Technology Track now includes investigators from all scientific career stages.

Keynotes. The Keynote Presentations (http://www.iscb.org/ismb2008/keynotes.php) are run in a single track with no other competing session and typically attract most participants. In Toronto we will continue our pursuit of several missions for these talks: to make the marriage between computational and experimental biology more beneficial for biology, to present outstanding, exciting, and thought-provoking jewels of the biological sciences, and to celebrate the marvels uniquely represented in the world by ISCB. Two Keynote Presentations feature the winners of the annual ISCB awards—the Overton Prize, in memory of Chris Overton, for outstanding investigators early in their career, and the Accomplishment by a Senior Scientist Award given to those at the zenith of their career who have made major contributions to the field of computational biology through research, education, service, or a combination of the three. This year’s Overton prize goes to Aviv Regev (Broad Institute of MIT and Harvard, Cambridge, Massachusetts, United States), and the Senior Scientist award goes to David Haussler (University of California Santa Cruz and Howard Hughes Medical Institute, Santa Cruz, California, United States). The awards will be presented along with the accompanying Keynote addresses. In fact, the Senior Scientist will conclude the scientific presentations of ISMB on the afternoon of Wednesday, July 23. Claire M. Fraser-Liggett (Institute for Genome Sciences, University of Maryland, Baltimore, Maryland, United States) will kick off the main meeting with her talk on Microbiological Communities in Health and Disease. The five other Keynotes will be given by (in alphabetical order): David Jaffe (Broad Institute of MIT and Harvard, Cambridge, Massachusetts, United States), Hanah Margalit (Hebrew University, Jerusalem, Israel), Eugene M. Myers (Howard Hughes Medical Institute, Ashburn, Virginia, United States), Bernhard Ø. Palsson (University of California San Diego, La Jolla, California, United States), and Morag Park (McGill University, Montreal, Canada). These lectures will review recent outstanding results in areas such as Oncology, Metabolic modeling and reconstruction, transcriptional regul-
tion, genomics, microbiology, neuronal Imaging, and new sequencing technolo-
gies.

Special Sessions Track. For the second year, a Special Sessions Track ([http://
www.iscb.org/ismb2008/special_sessions. php)] will enable in-depth focus on emerging
and important areas. Seven Special Sessions
will cover a wide spectrum of topics,
including sequencing, mass spectrometry,
flow cytometry, and cell imaging. For
example, the session on Health and Diseases
in our Genomes chaired by ISMB’s honorary
co-chair Thomas Hudson (Ontario Institute
for Cancer Research, Toronto, Canada) will
highlight the role of computational biology
spanning from analyzing human genome
variability to understanding disease. Other
Special Sessions will feature the Toronto
scientific community’s efforts towards
aspects of proteomics and disease, e.g.,
Interaction Networks and Disease chaired by
Shoshana Wodak and Gary Bader
(University of Toronto, Toronto, Canada)
and Structural Bioinformatics: Deciphering the
Proteome chaired by Igor Jurisica (Ontario
Cancer Center, Toronto, Canada) and
Ryan Lilien (University of Toronto,
Toronto, Canada). Imaging techniques are
introduced in Frontiers in Cell Imaging
chaired by Robert F. Murphy (Carnegie
Mellon University, Pittsburgh, Pennsyl-
vania, United States), the challenges of
tackling the interactions between organisms
are summarized in Computational Challenges
and Opportunities in Host-Pathogen Systems
Biology chaired by T. M. Murali and
Matthew D. Dyer (Virginia Polytechnic
Institute, Blacksburg, Virginia, United
States), and the very large-scale
sequencing of the future is previewed in
Sequencing Thousands of Human Genomes
chaired by Francisco De La Vega
(Applied Biosystems, Foster City,
California, United States) and Gabor
Marth (Boston College, Chestnut Hill,
Massachusetts, United States).

Finally, a group of investigators in-
volved with both ISCB and the Society’s
official journal, PLoS Computational Biology,
present a perspective on the Future of
Scientific Publishing chaired by Scott Markel
(ISCB Publications Committee chair,
Accelrys, San Diego, California, United
States). This is one of the two events
highlighting the connection between ISCB
and PLoS Computational Biology (the other is
a Tutorial on Professional Development given by
Phil Bourne, the Editor-in-Chief of PLoS
Computational Biology).

All Special Sessions will review the current
state of a specialized field, and will explore
growing opportunities for computational
biologists and the need for new tools and
methodologies.

Proceedings Track. Traditionally the major
event at the ISMB meetings is the
presentation of original papers, which are
published in the ISMB Proceedings as a special
issue of the journal Bioinformatics. Common
practice for computer science precludes the
re-publication of material published in
Conference Proceedings in any other peer-
reviewed journal or meeting. Thus, the special
issue of Bioinformatics increases the value of
these Conference Proceedings for the more
biology-oriented members in the field.
In 2008, we received 287 submissions to this
track; Alfonso Valencia (CNIO, Madrid,
Spain) chaired the rigorous review process
modeled on the editorial review in scientific
journals. He and his team of Area Chairs
selected 48 (16.7%) original research papers
for presentation in Toronto. This
acceptance rate is slightly higher than

One problem for the reviewers is that
submissions have to be accepted or
rejected given the submitted material
without the conditional acceptance pend-
ing major revisions that satisfy the authors.
In fact, most papers accepted by journals
go through revisions and are published
whenever ready; the Proceedings, in con-
trast, have to be ready by May. For the
first time, the mechanism of revision for
some of the submissions was used, by
Alfonso Valencia and his team of experts,
which accounted for the higher accep-
tance rate.

Papers will be presented in two parallel
tracks. The paper reviewing process put
increased weight on work that opens new
directions and is likely to impact molecular
and medical biology. All papers selected
for oral presentation will be published in the
conference proceedings as part of a
regular online issue of Bioinformatics under
the open-access model, i.e., will be made
freely available, and, as in previous years,
will be fully indexed in PubMed and by
the Institute of Scientific Investigation
(ISI).

Highlights Track. For the second
year, there will be a Highlights Track
([http://www.iscb.org/ismb2008/highlights. php)] featuring recently published, high
impact work. Work from highly ranked
journals and from journals traditionally
featuring more experimental biology is
welcome. As with the other two tracks that
were introduced in Vienna (Special Sessions
Track and the Industry Track, below), the
Highlights Track was very well received by
many participants, as it increased diversity
and added quality. This year, we received
189 proposals for this track. A diverse team
of accomplished and dedicated experts
accepted 61 of those for presentation in
two Highlights Tracks in Toronto (Table 1).

Industry Track. The Industry
Track ([http://www.iscb.org/ismb2008/
industrytrack.php]) will run for the second
year and is for talks that are more relevant
and interesting for participants from
industry. Chaired by Reinhard Schneider
(EMBL, Heidelberg, Germany), this track
introduces a new forum for the meeting of
academia and industry in a venue that
highlights innovative applications and
practical impact studies of Life Science
Informatics. Each selected talk will
describe a scientific problem from a
business perspective, including the
approach used to address the problem,
the current state of the project, an
evaluation of the benefits, and plans for
future developments. These presentations
are tailored to give attendees the opport-
unity to view scientific approaches through
an industrial lens, which may prove
especially valuable to young researchers’
understanding of the use of Life Science
Informatics in the business sector.

Technology Track (previously Demo
Track). Demonstrations of software have
also become an integral part of the
ISMB and ECCB conference series, and
are now also offered at other bioinformatics
conferences. Demos allow academic
institutions as well as for-profit organiza-
tions to showcase their software and/or
hardware in a hands-on format to
audiences of up to 50 participants. The
Demo sessions have proven to be in high
demand, and have consistently added a
valuable aspect of the conference for both
presenters and attendees alike. These
traditional demonstrations are currently
being selected by a team of experts
chaired by Rodrigo Lopez (EBI, Hinxton,
England) and a team of experienced
colleagues.

For the Toronto meeting, we decided to
extend the concept of demonstrations by
integrating other events that had no
traditional place in the ISMB framework.
The change in the name from Demo to
Technology Track reflects the following
extensions and novelties. Firstly, we will
give institutions and research consortia the
opportunity to reserve a block of slots and
use this to evolve the concept of a demonstration into a series of synchronized demonstrations. The second is another Toronto pilot: in addition to the traditional tutorials, we will introduce interactive, hands-on workshops for freely available software tools and methods. The ones chosen for the pilot reflect the wide range of popular packages and the range of activity in Computational and Systems Biology. These workshops will be more comprehensive than the current “demos” and give attendees an opportunity to bring their own data, laptops, and problems for practical learning.

**Posters: Continuous Display.** For the second time, all Posters (http://www.iscb.org/ismb2008/posters.php) accepted for presentation will be on exhibit for the entire meeting. Over the years, ISMB has grown to a size that has made it impossible to display all accepted posters during the entire conference. Yet, posters bring enormous value to the conference. The Metro Toronto Convention Center hosting ISMB 2008 has the capacity to accommodate more than 1,000 Posters on display at the same time. Therefore, we are especially pleased to ease the viewing of Posters by allowing all attendees the opportunity to view and absorb this abundance of research in a single venue. Two Poster Author Sessions, carved out of the evening program, will provide an opportunity to further explore posters of specific interest to any attendee: one evening for even- and one for odd-numbered Posters will be available. Marco Punta (Columbia University, New York, US) chairs the selection of Posters in Toronto.

**Tutorials, SIGs, and Students’ Symposium.** An increasingly important aspect of ISMB is the series of smaller meetings that accompany the main event, namely the Satellite and Special Interest Group Meetings (SIGs: http://www.iscb.org/ismb2008/sigs.php). For Toronto, the event is coordinated by a group of experts chaired by Hershel Safer (Weizmann Institute, Rehovot, Israel). Five meetings will run for two days (July 18–19) and four for one day. The two-day meetings are: 3Dsig: Structural Bioinformatics & Computational Biophysics, the Bioinformatics Open Source Conference (BOSC), BioPathways, Alternative Splicing, and the Joint AFP-Biospens SIG. Two of the one-day meetings will precede the main meeting: BioLink (July 18) and Next Generation Sequencing (July 19). Two others will occur during the main meeting: BioOntologies (July 20), and Genome-Scale Pattern Analysis in the Post-ENCODE era (July 21).

From the beginning, an integral part of ISMB has been the Tutorials (http://www.iscb.org/ismb2008/tutorials.php) that ran the day before the main meeting. Janet Kelso (MPI for Evolutionary Anthropology, Leipzig, Germany) chairs this event. In the attempt to shorten the overall meeting, the Tutorials will be given in parallel with some of the SIGs on July 19.

For the first time, the ISCB Student Council Symposium (SCS4; http://www.iscb.org/ismb2008/scs4.php) on July 18 chaired by Lucia Peixoto (University of Pennsylvania, Philadelphia, US) and Amr Abuzeid (Queen’s University, Toronto, Canada), will run in parallel with the first day of two-day SIGs preceding ISMB. Each of these pre-conference meetings offers additional opportunities to learn and network with a specific group of peers of similar interests and goals.

**ISMB Expo.** Another pillar of ISMB is the Exposition that runs through the entire main meeting (July 20–23). The ISMB Expo has consistently proven to be highly successful for the exhibiting companies featuring products and services of specific value to the computational biology community. Similarly, ISMB attendees take full advantage of the opportunity to meet one-on-one with the conference sponsors and exhibitors to catch the latest updates and information on valuable software, hardware, publications, and tools of the trade. Overall, the Expo is another avenue focused on the importance of industry in science, and many of the exhibitors present talks in the Industry Track to detail the problems, applications, benefits, and future plans being addressed within their companies.

**More than just science.** Attendees traveling with family members and/or children will find this year’s event offers a variety of optional tours and activities during the meeting, and extended tours on dates surrounding the conference. Specifically for those traveling with children, we are working on providing childcare options and information that would enable parents to attend the meeting while children are safely entertained.

Two other Toronto novelties try to expand into different realms: The first is Visual Reflections on Science (http://www.iscb.org/ismb2008/vrs.php) organized by the ISCB Student Council (ISCBC; http://www.iscbsc.org/) and chaired by Milana Frenkel-Morgenstern (Weizmann Institute, Rehovot, Israel). A space has been set aside for the presentation of ideas that reflect upon science from a very different perspective—perhaps more art than science. Finally, we will celebrate the 16th ISMB with an Off-Site Dinner.
followed by the high energy Matrix Party; this event will happen in Toronto’s Liberty Grand (http://www.libertygrand.com/) entertainment complex.

**Challenges of numbers.** Many of us may remember our first ISMB and our surprise at how many colleagues we wished to connect with attended the meeting. ISMB connects an interdisciplinary scientific community through a single, international point of contact. ISMB has been growing in terms of its breadth of coverage and the number of presentations (Figure 2).

At our current size, it becomes extremely challenging to identify venues that are big enough to host meetings and at the same time small enough to foster informal communication and a more intimate feel. While many countries have venues that would allow meetings of between 1,000 and 5,000 participants, such venues often do not permit the level of full-scale parallelism that ISMB has grown into (e.g., since we cannot tell upfront which track will be most visited, we currently need to reserve seven rooms each of which can seat more than 700 participants). The Metro Convention Center in Toronto is one of the few sites that appear to be ideal for the goals of ISMB.

ISMB 2008 is expected to draw more than 1,400 attendees to Toronto to take part in the world’s largest and most scientifically comprehensive bioinformatics meeting of the year. ISCB members gain significant ISMB 2008 Registration (http://www.iscb.org/ismb2008/registration.php) discounts, while non-members are offered a complimentary one-year-membership as part of their higher non-member fees. The early bird registration discount period ended June 4 for all registration categories, although registration will remain open through the conference dates.

We hope to welcome all of you in Toronto.

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**Figure 2. Increasing Breadth of ISMB.**
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