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ISCB: past–present perspective for the International Society for Computational Biology

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ABSTRACT

Since its establishment in 1997, International Society for Computational Biology (ISCB) has contributed importantly toward advancing the understanding of living systems through computation. The ISCB represents nearly 3000 members working in >70 countries. It has doubled the number of members since 2007. At the same time, the number of meetings organized by the ISCB has increased from two in 2007 to eight in 2013, and the society has cemented many lasting alliances with regional societies and specialist groups. ISCB is ready to grow into a challenging and promising future. The progress over the past 7 years has resulted from the vision, and possibly more importantly, the passion and hard working dedication of many individuals.

BEGINNING

The year 1993: the dawn of the Internet; Gopher with bookmark lists instead of Google; the first public servers for molecular biology have popped up (Henikoff, 1993) and with it the dawn of a new era: the explosion of computational biology and bioinformatics. Larry Hunter, Russ Altman and others shared a vision to bring biology into computer sciences and *vice versa* and organized the first Intelligent Systems for Molecular Biology (ISMB) meeting. The sequencing of entire chromosomes (Goffeau *et al.*, 1993) and 2 years later of entire organisms (Fleischmann *et al.*, 1995) drove a demand for experts in their analysis. ISMB grew exponentially. At the fifth ISMB (Halkidiki, Greece), a few visionary shapers created the International Society for Computational Biology (ISCB). Missions for the society have been as follows: advancing the understanding of living systems through computation, nurturing the next generation of scientists and the communication of the importance of the field. Another more mundane goal has been the creation of a home, an organizational support infrastructure for this new field that bridges antipodal cultures and interests.

'All beginnings are difficult'? This one could hardly have been simpler: the field continued to explode: over 1600 scientists participated in the 10th ISMB (2002 Edmonton, Canada, Fig. 1). The 5-year old ISCB had 1500 members (Fig. 1). Many issues, however, had not been addressed: members joined for 1 year at a time; membership fees could not be credited toward minor reductions in registration fees; ISMB was run by individual scientists with <12 months of planning and few lessons learned were passed on; ISCB had some oversight, but little control and role.

On top of those issues, one important leap is challenging for any enterprise, namely, that from being driven by passionate visionaries who generously and freely give to being carried by professionals who earn their living with their job. It requires hiring staff and contractors and creating an organizational infrastructure [officers, executive committee, board of directors (BoD), committees and their chairs]. Those who had expected ISCB to complete this transition within much less than a decade had been over-optimistic.

CRISIS

At the end of 2006, ISCB had again ~1500 members (Fig. 1). Two ISMBs had moved outside the geographic base of most ISCB members (North America and Western Europe): 2003 Brisbane, Australia and 2006 Fortalezza, Brazil. Both had failed to attract as many participants as needed. Consequently, ISCB's assets were so low that one additional ISMB returning less than needed might have caused a severe financial bottleneck.

At the beginning of 2007, ISCB was under immense pressure: it had to finally seize control over ISMB and to generate new revenues at a moment as extreme economic challenges began to hit. Many of the first generation computational scientists who jumped onto the bandwagon of biology had at that point been securely seated in biology. This tremendous achievement hit the society: funding agencies reacted to the economy by reducing support for meetings. Investigators have since been forced to choose between the meeting driven by the specific biological topic (e.g. genome sequencing) and the generic meeting of the field of computational biology. Many choose the first, i.e. computer scientists were immersed in biology. This was a sign of ISCB's success in bringing computer scientists into biology. Unfortunately, the 'success' reduced the participation at ISMB, the revenues of which accounted for most of what kept the society afloat in 2006. Furthermore, membership oscillated by >50% around 1500, depending on ISMB attendance. Reduced ISMB participation costs ISCB twice (less registration, few members). On top, the move into open access publication deprived the society of an important revenue stream and an important partner. How to attract more members while funding shrinks? How to raise revenues when the sources have dried up that had created more income than the membership fees (private donors and journals)?

Catharsis

How did ISCB rise from the crisis? As one who has most closely been monitoring the transition from crisis to catharsis, the

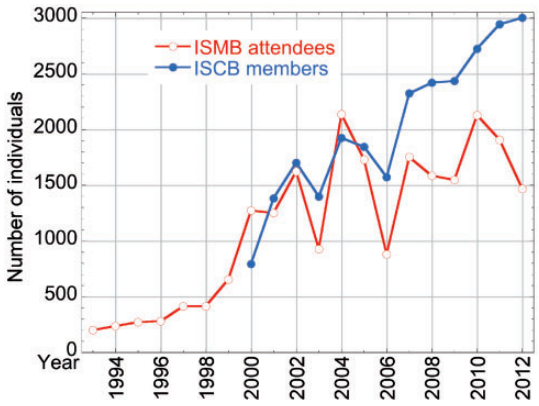

Fig. 1. Comparison between number of ISMB attendees and number of ISCB members. Until about 2007, those two were strictly correlated; over the past years, ISCB has established a solid base that remains high even when the attendance of ISMB significantly drops below the 3-year average as it did in 2012 at the meeting in Long Beach, Los Angeles, CA, USA

author is not sure. The achievements of ISCB over the past 7 years have been amazing. Several teams of individuals have stepped up to the challenges and have steered the ship into steady waters. Important have been the staff and contractors, the executive committee, several committee chairs and committees, the student council and many individuals who have contributed their goodwill and passion. As a result, ISCB has succeeded in providing a working template for ISMB; it has signed a long-term deal guaranteeing ISMB/ECCB meetings every 2 years; meetings are now planned >3 years in advance and a semiautomated planning process for ISMB operates under the oversight of a talented Conference Director (Steven Leard) and his team.

Having the main annual event ISMB alternate between sites attractive to and easily reachable by members from North America and Western Europe implied that ISCB had to make additional efforts to justify the 'international' in its name. One important step toward this end was the organization of new meetings with regional focus. These *ISCB-x* meetings—the *ISCB-Africa* co-organized with the African Society for Bioinformatics and Computational Biology (2009 Bamako, Mali; 2011 Cape Town, South Africa; 2013 Casablanca, Morocco), the *ISCB-Latin America* (2010 Montevideo, Uruguay; 2012 Santiago, Chile; 2014 Sao Paulo, Brazil) and the *ISCB-Asia* (2011 Kuala Lumpur, Malaysia—co-organized in conjunction with InCoB and APBioNet; 2012 Shen-Zhen, China—co-organized with BGI; 2013 Seoul, South Korea—co-organized in conjunction with the Translational Bioinformatics Conference). At the same time, ISCB has begun to get involved with the *ISCB-focus* meetings (*Conference on Semantics and Healthcare and Life Sciences—CSHALS* in Boston from 2007–2014; 2013 *Next NGS challenge* Valencia, Spain; others to follow) and in regional meetings (*GLBIO* and *Rocky*). Instead of having involvement with two meetings, ISCB now runs >8 meetings each year. What a leap! At the same time the membership base has more than doubled (nearly 3000), many members have signed up for multiple years and instead of 80–100 scientists presented at ISCB meetings in 2006, >500 are going to present at ISCB meetings in 2013. ISMB ran on a single-track from 1992–2002, increased to 2–3 parallel tracks from 2003–2006 and jumped to 6–9 parallel tracks thereafter. This increased the complexity of the organization substantially, and it also more than quintupled the number of scientists who present at the meeting.

ISCB has evolved from being at the fringes to becoming a thriving hub for the computational biology community. ISCB meetings are fun and are the place where people want to be, to network, to communicate the latest science and for the fun! This has been a big step and has taken an immense amount of effort. ISCB stands stronger scientifically and financially than ever before; it has grown into The International Society for Computational Biology.

What got us there was hard work. There are many important details the society eventually got right. However, I believe, the main reason for the success were the people who have driven it. Many cared, many put in their talents and passion.

To mention just a tiny subset: Reinhard Schneider completely turned the membership services and the ISCB Web site around and helped importantly to securing a solid financial standing. Janet Kelso was absolutely crucial for the conferences. Scott Markel brokered deals with publishers that appeared impossible. Michal Linial made the association with European Conference on Computational Biology (ECCB) happen and, like Terry Gaasterland, added many important advances. Thomas Lengauer, Søren Brunak and Alfonso Valencia were instrumental for the identification of scientists deserving ISCB's prestigious awards. Rick Lathrop found ways to push forward our stance on open access. Manuel Corpas was instrumental in kicking off ISCBSC, the student council that became an immensely important constituent (many supported him and many carried the torch to greater heights, too many, in fact, to list here). Alex Bateman brought ISCB closer to Wikipedia. Dietlind Gerloff for many years helped to find the right people for the ISCB BoDs and officers. Mona Singh and Pierre Baldi contributed importantly to making the fellows concept work out. Fran Lewitter and Bruno Gaeta have begun to find new roles for ISCB's contributions toward education. Lonnie Welch and Bruno Gaeta important advanced the role of affiliates. Finally, Olga Troyanskaya and Lonnie Welch for their role in making the society pages in our journals, *Bioinformatics* and *PLoS Computational Biology*, more successful. The length of the aforementioned list may fool readers into assuming it would somehow be complete. May be those who advanced ISCB the most over the past 7 years are listed previously, but those few mark only the tip.

Finding the right people has been the tricky part. The more ISCB succeeds, the more appear who want to get instead of give, and have to be fended off. Even more complicated is the following immanent problem: 'truly happy and passionate scientists' typically succeeded more alone in the unknown than in teams. They often are not best suited for the realities of committees and infrastructural bodies. Consequently, volunteers for committees might not always be the ones best connected to their peers and might not optimally advance scientific societies. The challenge is to support exactly those in synch with their peers and who are willing to give themselves for little return. ISCB succeeded thanks to many who have done exactly this.

Perspective

The immediate future of ISCB will have to begin with consolidation: the immense expansion of activities that has marked the past 7 years' history of ISCB has been achieved on the shoulders of a small staff and many volunteers. Many of those resources are stretched to the limit and will have to be replenished. One important step toward this end is the increase in staff. The revenue for this increased bill has to come from new sources. One source could be an increase in the number of attendance to ISMB [more details in Rost *et al.* (2012)]. Simply put, if we had 800 participants more for the next 7 years, ISCB might be able to sustain most of its annual spending from the interest of its assets in 2020. This would constitute a level of stability of its existence that 7 years ago, we would not even have dreamed of.

Another important goal would be to once again double the membership base over the next 7 years. I believe that this will only be possible if we moved to some variant of a 'federated society' in which ISCB is the roof over a federation of many national and regional societies, groups and activities. Approaching such a goal is one big challenge ISCB's next president might dare to take on.

Other challenges for the immediate future revert around themes that have already begun over the past years. For instance, we need to invest more into smaller meetings. The *ISCB-x* meetings have taken off and are a solid value that is there to stay. The newly launched concept of *ISCB-focus* meetings now needs to grow more. Ultimately, all of those small meetings should bring important scientific value, ample fun and enough revenue to become sustainable. A tall order for small events that easily outgrow the resources planned (Rost *et al.*, 2012).

Science revolutionizes technology, technology changes communication, then science has to adapt to what it tread off. ISCB has embraced such new possibilities much more than many of its sister societies in FASEB (Federation of American Societies for Experimental Biology). For instance, the commitment to open access (Lathrop and Rost, 2011a, b) even at the expense of loosing 25% of its annual revenue was an unusually bold and unique stance. We were the first society that actively encouraged blogging at a moment at which other societies curtailed this development (Lister *et al.*, 2010a, b). ISCB has begun to embrace Wikipedia [open competition for writing Wikipedia pages (Bateman *et al.*, 2012)]. The videos of ISMB talks are now available for members to download. Impressive start, now ISCB needs to spearhead new means of communication in science (videos, movies, YouTube, Wikipedia, social media). A visionary ISCB will advance online education and meetings, and it will actively shape the future of communication in science at the interface of today's two most rapidly advancing revolutions: molecular biology and computers.

ISCB has a unique position determined by the immense rapidity of the revolutions in its constituents. We are small, we are young and we have reinvented and renewed ourselves over and over again for the past two decades. We have comparably little resources, and it is mind-boggling what we have been able to achieve with this. Arguably, computational biology is evolving more rapidly than any other field, and it is doing this under immense pressures to 'deliver' solutions. This reality has marked ISCB in many unique and positive ways.

The class of *ISCB fellows* has been the latest addition to our infrastructure. It will hopefully evolve into another foundation on which the society can stand (along with the current four: staff/executive committee, BoD, student council and members). ISCB fellows are the shining stars in the field and/or those who have brought the society forward. The integration of ISCB fellows in ways that benefit both the fellows and the society may become another important hook into an even brighter future.

Computational biology has been established at the level of institutes and inter-department centers. Now the challenge to address is evolving this new dynamic field onto the level of university departments. A related task may be the presence on the level of panels in funding agencies.

In all of this, ISCB will continue to rely on the support of its members, and those who take matters in their hands and bring us forward.

ISCB has contributed importantly toward advancing the understanding of living systems through computation. It has succeeded through publications, through seeding the community and aligning it as well as through creating fun and scientific excitement. A dynamic young field defined by an outstanding degree of interdisciplinary courage to grow beyond what we see today and to do this together as a community of scientists. No doubt that this community will to grow and flourish over the coming years.

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