

= Intelligent Systems for Molecular Biology =

Intelligent Systems for Molecular Biology (ISMB) is an annual academic conference on the subjects of bioinformatics and computational biology organised by the International Society for Computational Biology (ISCB) . The principal focus of the conference is on the development and application of advanced computational methods for biological problems . The conference has been held every year since 1993 and has grown to become one of the largest and most prestigious meetings in these fields , hosting over 2 000 delegates in 2004 . From the first meeting , ISMB has been held in locations worldwide ; since 2007 , meetings have been located in Europe and North America in alternating years . Since 2004 , European meetings have been held jointly with the European Conference on Computational Biology (ECCB) .

The main ISMB conference is usually held over three days and consists of presentations , poster sessions and keynote talks . Most presentations are given in multiple parallel tracks ; however , keynote talks are presented in a single track and are chosen to reflect outstanding research in bioinformatics . Notable ISMB keynote speakers have included eight Nobel laureates . The recipients of the ISCB Overton Prize and ISCB Accomplishment by a Senior Scientist Award are invited to give keynote talks as part of the programme . The proceedings of the conference are currently published by the journal Bioinformatics .

= = History = =

= = = Early meetings = = =

The origins of the ISMB conference lie in a workshop for artificial intelligence researchers with an interest in molecular biology held in November 1991 . The workshop was organised by American researcher Lawrence Hunter , then director of the Machine Learning Project at the United States National Institutes of Health 's National Library of Medicine (NLM) in Bethesda , Maryland . A subsequent workshop on the same topic held in 1992 , hosted by the NLM and the National Science Foundation , made it clear that a regular international conference for the field was required . Such a conference would be dedicated to molecular biology as a rapidly emerging application of artificial intelligence . Having successfully applied for grants from AAI , NIH and the Department of Energy Office of Health and Environmental Research , the first ISMB conference was held in July 1993 , at the NLM . The conference was chaired by Hunter , David Searls (research associate professor at University of Pennsylvania School of Medicine) and Jude Shavlik (assistant professor of computer science at University of Wisconsin ? Madison) and attracted over 200 attendees from 13 countries , submitting 69 scientific papers .

The success of the first conference prompted the announcement of a second ISMB conference at the end of the meeting . ISMB 1994 was initially planned to be held in Seattle . However , a competing meeting forced ISMB to change venues at short notice . The conference was held at Stanford University in August 1994 and was organised by Russ Altman , a research scientist at Stanford University School of Medicine . To emphasise the international aspect of the conference , ISMB 1995 was held at Robinson College , Cambridge . ISMB 1995 also marked a shift in the focus of the conference . ISCB Board member and Director of the Spanish National Bioinformatics Institute Alfonso Valencia has stated that , in 1995 , " the conference changed from a computer science @-@ based conference to a point where everyone realized that , if you want to make progress , there has to be more focus in biology . "

= = = Formation of ISCB and expansion = = =

ISMB 1997 was held in Halkidiki , Greece and marked the foundation of the International Society for Computational Biology (ISCB) . ISCB was formed with a focus on managing all scientific , organizational and financial aspects of the ISMB conference and to provide a forum for scientists to

address the emerging role of computers in the biological sciences . ISCB has assisted in organising the ISMB conference series since 1998 . The period following the formation of ISCB also marked an expansion in the number of ISMB attendees : ISMB 2000 (held at the University of California , San Diego) was attended by over 1 @, @ 000 delegates , submitting 141 scientific papers . This meeting was also the last time ISMB would be held at a university , due to size limitations .

= = = Partnership with ECCB = = =

In 2004 , ISMB was jointly held with the European Conference on Computational Biology for the first time . The conference was also co @-@ located with the Genes , Proteins and Computers conference . This meeting , held in Glasgow , UK , was the largest bioinformatics conference ever held , attended by 2 @, @ 136 delegates , submitting 496 scientific papers . Alfonso Valencia considers ISMB / ECCB 2004 to be an important milestone in the history of ISMB : " it was the first one where the balance between Europe and the States became an important part of the conference . It was here that we established the rules and the ways and the spirit of collaboration between the Americans and the Europeans . " The success of the joint conference paved the way for future European ISMB meetings to be held jointly with ECCB .

= = = Recent meetings = = =

By the end of 2006 , ISCB was in financial difficulty . Two conferences (ISMB 2003 , in Brisbane and ISMB 2006 , in Fortaleza) had drastically reduced numbers of participants due to their location , with a corresponding reduction in income . To allow more delegates to attend , it was decided to limit conference locations to North America and Europe . In January 2007 , ISMB and ECCB agreed to hold joint conferences in Europe every other year , beginning with ISMB / ECCB 2007 . ISMB would be held in North America in the years between joint meetings . As of 2016 , this pattern has been confirmed to continue until at least 2019 . ISMB / ECCB 2007 (held in Vienna , Austria) marked the first conference for which ISCB took full responsibility for organising . Vienna became the first city to host ISMB twice with ISMB / ECCB 2011 . This ' return visit ' was an experiment intended to reduce the increasing effort required to find suitable conference venues . Although the return to Vienna was only deemed partially successful due to price increases , Boston (which hosted ISMB 2010 and 2014) is predicted to become a ' safe ' site which ISMB can periodically return to .

ISMB celebrated its 20th meeting with ISMB 2012 , held in Long Beach , California . This event attracted around 1 @, @ 600 delegates , submitting 268 scientific papers . Richard H. Lathrop and Lawrence Hunter presented a special keynote presentation , looking back at previous ISMB meetings and attempting to predict where the field of bioinformatics may head in the future . ISMB / ECCB 2013 was held in Berlin , Germany and was attended by around 2 @, @ 000 delegates , submitting 233 scientific papers .

= = Format = =

= = = Main conference = = =

The main ISMB conference is usually held over three days and consists of presentations , poster sessions and keynote talks .

Academic papers at ISMB were traditionally presented in a single track . Presentations at ISMB 1994 were split further into three themed days , focusing on protein secondary structure prediction , sequence analysis and AI techniques and biochemical applications , respectively . As attendance at ISMB increased , the single track approach became increasingly unsustainable and two parallel tracks were introduced at ISMB / ECCB 2004 . Further expansion meant that , by ISMB 2012 , over 200 talks were presented in nine parallel tracks including multiple proceedings tracks , a highlights track and a technology track . The introduction of parallel tracks to ISMB was controversial .

Christopher Rawlings (head of Computational and Systems Biology at Rothamsted Research and organiser of ISMB 1995) has said : " There were a lot of people who wanted to keep it more strongly in the AI intelligent systems model and have a meeting where everybody would go to everything . But it just grew too big . We just couldn't . " As the number of submitted proceedings papers has increased , the acceptance rate has decreased dramatically , from 75 % in 1994 to 13 % in 2012 . ISMB proceedings from 1993 @-@ 2000 were published by AAAI Press . Since ISMB 2001 , proceedings have been published in the journal Bioinformatics . The number of posters presented at ISMB has also increased dramatically . 25 posters were presented at ISMB 1994 ; at recent ISMB meetings , 500 @-@ 1 @, @ 000 posters have been presented in multiple poster sessions .

Keynote talks are presented in a single track and generally attract the largest audience . These presentations are chosen to highlight outstanding research in the field of bioinformatics . Notable ISMB keynote speakers have included eight Nobel laureates : Richard J. Roberts (keynote speaker in 1994 , 2006) , John Sulston (1995) , Manfred Eigen (1999) , Gerald Edelman (2000) , Sydney Brenner (2003) , Kurt Wüthrich (2006) , Robert Huber (2006) and Michael Levitt (2015) .

As of 2012 , ISMB runs on a budget in excess of \$ 1.5M and , in terms of proceeds , brings in four times that of the other ISCB conferences (ISCB @-@ Latin America , ISCB @-@ Africa , ISCB @-@ Asia , Rocky Mountain Bioinformatics Conference , CSHALS and the Great Lakes Bioinformatics Conference) combined . Standard registration fees (as of 2013) are around \$ 1 @, @ 000 for academics who are ISCB members (\$ 1 @, @ 350 for non @-@ members) , with lower rates for students and higher rates for corporate delegates respectively . Discounts are provided for early registration .

== Satellite events ==

Pre @-@ conference tutorials have played an important role in ISMB since the first conference . Tutorials at ISMB 1994 included introductions to genetic algorithms , neural networks , AI for molecular biologists and molecular biology for computer scientists . Tutorials on computational mass spectrometry @-@ based proteomics and ENCODE data access were presented at ISMB / ECCB 2013 .

As attendance at ISMB grew in the late 1990s , several satellite meetings and special interest group (SIG) meetings formed alongside the main conference . SIG meetings are held over one or two days before the main conference and focus on a specific topic , allowing more detailed discussion than there would be time for in the main conference . Notable SIG meetings include the Bioinformatics Open Source Conference (BOSC) , which has been held annually since 2000 and Bio @-@ Ontologies , which has been held annually since 1998 . Satellite meetings are usually two days long and are held in conjunction with ISMB . The 12th CAMDA conference and the 9th 3DSIG meeting were held as satellite meetings of ISMB / ECCB 2013 .

== List of conferences ==