

ASBCB Newsletter

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Special points of interest:

- ISCB-SC Student Initiatives
- Avian Influenza (AI)
- Bioinformatics Capacity at Institut de Pasteur

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Message from the Vice - President



It is my privilege to write this message to you all as African Scientists with involvement and interest in the fields of Bioinformatics and Computational Biology. Being in the research and training fields is challenging at the best of times – ensuring sufficient funding to conduct research as well as coping with everyday problems of an administrative overload.

Although research in Africa is furthermore hampered by problems like power failures and lack of bandwidth, these are not insurmountable

problems and do not detract from the enthusiasm I have encountered in many fellow African scientists. Numerous workshops, training events and conferences on bioinformatics have been organized by individuals and groups from all over Africa over the last few years.

It is with great excitement that we are witnessing a spontaneous drive amongst African scientists involved in these fields to get together, make contacts and discuss science. Long past are the days where a scientist could work in isolation in his or her own lab – the only way that the current scientific questions can be addressed is by forming research networks and partnerships. Not only can we

share laboratory and computing resources, but more importantly share ideas and get a better insight into science by discussing it.

It is an exciting time to be involved in Bioinformatics and Computational Biology as these disciplines are at the technological forefront, enabling us to push back boundaries of science. Let us make use of the opportunities to work together and show the world that African problems can be addressed and solved by African Science!

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Word from the Editor

You have probably heard a lot about comparative genomics in the past but over the last years, there has been a realization that products of genes are embedded in large-scale interac-

tion networks at the molecular level. Whole genome characterization has conventionally unraveled numerous species-specific details including but not limited to genome size, gene

number, patterns of sequence duplication and syntenic relationships. Although it is yet unreasonable to expect that everybody's favorite organism will be sequenced to completion,

“The Student Council (SC) strives to provide opportunities for networking, and career enhancement among other benefits.”

the animal and plant research communities as a whole would benefit from candidate genomes chosen within a reasonable phylogenetic framework. These would provide insights into how genomes evolve in structure and function, while also allowing for a link in the genome structure and the organism biology.

Some of these important research areas will be discussed in more detail at the Bioinformatics conference 2007 in Nairobi, Kenya.

Topics addressed in this issue include sustaining bioinformatics in the continent through re-

search diversity as well as avian influenza (AI). This issue has also addressed student representation in the ISCB, which serves more than being a good way to jump start their careers in the sciences. The student council enables young scientists to have an opportunity to present their research findings to the international audience, gain valuable

networking experiences as well as gain a broader appreciation of bioinformatics and computational biology.

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Editor, ASBCB Newsletter



ISCB-SC Regional Student Group Initiatives

ISCB is the major global organization for computational biologists and bioinformaticians with an annual conference — ISMB. Since its founding in 1997, ISCB has grown to about 2000 members from over 50 countries.

The ISCB Student Council (ISCB-SC) facilitates opportunities for development and growth to young researchers in the emerging field of bioinformatics, computational biology and

systems biology. ISCB-SC represents the students' voice on the board of directors for ISCB and also organizes events that are very suitable to students (Masters, Doctorate students and Post doc fellows) The ISCB Student Council is the student arm of the renowned International Society for Computational Biology (ISCB), and young researchers. ISCB-SC has organized several International Student Symposia in

Computational Biology, career talks on “how to write scientific paper”, “A career in bioinformatics”. ISCB-SC has also organized events which encourages interactions between students and future employers, discussion sessions with senior scientists and mentors.

The Student Council (SC) continually strives to provide opportunities for networking, career enhancement and skills developm-

ent for those who aspire to become the next generation of computational biology leaders.

In a bid to ensure that no one is left behind in the abundant opportunities availed in bioinformatics and computational biology, ISCB-SC is keen to organize Regional Students Groups (RSGs) in all parts of the world. Therefore ISCB-SC has recently set up some RSGs including RSG-Singapore and RSG-India and working on setting up RSG-UK (London, Oxford, Cambridge), RSG-Brazil, RSG-USA (BioMeet), RSG-Canada(Canadian Bioinformatics Group), RSG-Japan (The Japanese Society for Bioinformatics) and RSG-Africa (ASBCB) to offer benefits that are specific to local regions.

RSG-Africa is a very good initiative that fosters speedy results to many challenges faced by many African students, young researchers and scientists in the field of bioinformatics and computational biology. I have personally benefited from opportunities that are availed in networking with ISCB-SC like opportunities for international grants, scholarships for students and young researchers, travel fellowship grants, opportunities to

meet and discuss challenges with renowned scientists in bioinformatics among others. ISCB-SC leadership has had several discussions with the organizers of “Bioinformatics for Africa, 2007” to be held in Nairobi, Kenya from 28th May-2nd June, 2007 and Dr. Olivier Gascuel will announce the official inauguration of this initiative. All African students and young scientists are encouraged to embrace this initiative by joining this group (ISCB-RSG-AFRICA) for endless opportunities.

In the near future, we foresee launching RSG Burkina Faso, RSG Cote d’Ivoire, RSA-Kenya, RSG-Mali, RSG Morocco, RSG-Nigeria, RSG-South Africa, RSG Sudan, RSG-Tanzania, RSG-Tunisia, among others countries in Africa etc.

To register, simply send an email to chair@iscbsc.org, CC: sfatumo@smail.uni-koeln.de with the subject “ISCB-SC RSG Africa Registration” and attach your CV.

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Reminder to participants and attendees of the Bioinformatics conference in Nairobi, Kenya—May 28-June 2, 2007.

There will be an inauguration session for the ISCB- Student Council - Regional Group for Africa during this conference. Please make a point of attending to encourage this important student initiative.



Genome News

Genetic Polymorphisms at Candidate Genes for Disease Resistance in Chicken

My study focuses on the phylogeographic analysis for molecular signatures of adaptive selection and polymorphisms at candidate genes for viral disease resistance or susceptibility in different chicken populations.

Viral diseases such as avian influenza (AI) are currently a global threat to the general public. In the poultry industry these diseases cause huge economic losses especially in commercial chicken populations. This is a major concern to small scale poultry farmers in developing countries in Africa and Asia who depend on poultry products as source of livelihoods. During viral infections like AI both innate and adaptive factors interact with the virus and this is crucial in the prevention of disease. The hypothesis for this study is that amongst the wild, indigenous and commercial chicken popu-

lations, there are diverse innate and adaptive genetic factors that confer resistance or susceptibility to avian viral diseases like AI.

This study aims to shortlist and characterize genotypes of toll-like receptors, cytokines and chemokines induced during a viral attack, their receptors and the molecules that they induce during a signal transduction process. These candidate genes are from several databases that include literature databases, signal transduction pathway databases, databases of genes associated with disease from gene expression studies and Expressed sequence tags (EST) databases. A simulation study on these candidate genes is carried out in order to detect molecular signatures of adaptive selection. This is done in the coding and if possible, non-coding regions of the

gene by the use of species homologs of these genes.

If a selection signal is present, experimental detection of polymorphisms at the sites with signatures of selection is carried out. Several bioinformatics and statistical software are then used to analyze the data for allele and haplotype frequencies. Several population genetic parameters and signatures of selection which now use population data on the different chicken populations are also performed.

Preliminary results show signatures of positive adaptive selection at amino acid sites of two genes. Polymorphisms at the short listed candidate genes are expected in different chicken populations. *In vitro* studies would be done on polymorphic candidate genes in different chicken populations for association to viral diseases. *In vivo*

studies would be performed on promising candidate genes to confirm disease association.

These results should pave way for marker assisted selection or introgression of the resistant genes in the African or Asian susceptible chicken populations.

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Sustaining Capacity and Implementing Bioinformatics at *Institut Pasteur de Tunis*

Institut Pasteur de Tunis (IPT) is a Tunisian research institution founded in 1883. Its missions are to conduct Research and Training activities on infectious diseases, R&D on vaccines, and Public Health Laboratory activities (PHL). Research and training programs are mainly oriented towards national health and/or eco-

nomics problems such as rabies, leishmaniases, tuberculosis, viral hepatitis, bovine theileriosis, veterinary microbiology, genetic disorders and scorpion or snake envenomations. Molecular biology applications perfectly integrated in the research programs of the Institute can be tracked back to the early 90's, providing a unique context for promoting bioinformatics

and its applications at the national and regional level, in highly relevant research areas, particularly for health. The diversity of the research activities, their complementarities, their unique combination within the health research system, the levels of expertise generated, and the North-South and South-South collaborations developed, contribute to this unique position.

Bioinformatics is crucial to take advantage of the last decade explosion of molecular biology and genomics data, to support and to be supported by the "wet research" laboratories.

The implementation of bioinformatics at IPT was done in six steps, with the support and following the recommendations of the UNICEF/WHO/UNDP/World and Special Programme for Research and

Training in Tropical Diseases (TDR), the *Réseau International des Instituts Pasteurs* (RIIP), the Ministry of High Education, and the Ministry of Health: (i) PhD and Post-Doctoral training of a resource scientist having a mathematics background (Sep 1996-Oct 2004); (ii) Continuous short term training of staff and students (from 1998 to date) through some of the high quality bioinformatics courses organized by bioinformatics courses organized by TDR (N=8), *Institut Pasteur* in Paris (N=4), and ICGB-Trieste (N=3); (iii) A dynamics of bioinformatics research projects development has been initiated in 2001 through a project supported by TDR promoting institutional networking on leishmaniasis and tuberculosis followed by other projects successfully funded by TDR and by *Institut Français de la Coopération*

or to be supported by the European Commission (SysCo project); (iv) Upgrading the institute's hardware (1 PC per scientist, servers, backup system), software and network infrastructure (Local network: Ethernet (10/100) and 1Go for the backbone; Internet connection: Special line of 2 Mb/s) and dedicated buildings; (v) Participating actively to the organisation of international introductory or advanced bioinformatics courses, and of a national Master degree of bioinformatics; (vi) Recruiting the trained bioinformaticist (Dec 2004), and starting and equipping a bioinformatics group (Mar 2005).

Four core functions have been assigned to the bioinformatics group: user support, bioinformatics support and establishment of an interface with "wet laboratories", in-house training, and R&D.

As an added value to the development of its activities, the bioinformatics group have started collaborations with different bioinformatics centers (e.g., the SANBI-South Africa, the Max-Planck Institute for Molecular Genetics-Germany, BIOBASE-Germany, IBDML-France) and is currently contributing to the development of adequate human resources.

Keywords: bioinformatics, capacity building, research, training, TDR, RIIP, North-South collaborations, South-South collaboration, Tunisia

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Institut Pasteur de Tunis

Reader Perspectives/Views on Contributions

In the last issue I had requested for your views on the preceding issue. So far no one has emailed me back. I am sure you will agree with me that your contribution is highly appreciated even if you are in the silent majority.

I will also request you to let me know what you want to see changed in the presentation of this newsletter.

Remember its success depends on each one of us.

For those of you who will be attending the conference in Nairobi, I take this opportunity to welcome

you to Kenya. Take a moment or two to learn about the country even if by just walking around the block. Not to mention getting a few souvenirs from the country.

And finally, a big thanks to all the sponsors who have made the bioinformatics conference in Nairobi, Kenya into a reality. I am certain there will be a lot to learn.

KARIBU
KENYA

Beatrice Kilel, Ph.D.

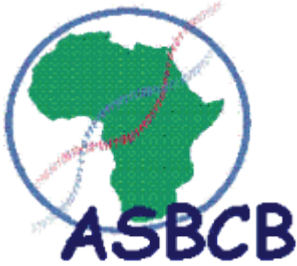
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We're on the Web!

[Http://www.asbcb.org/newsletter](http://www.asbcb.org/newsletter)

Conferences and Trainings

- May 06- 09, United States - [BIO International Convention](#)
2007 Boston
- May 07, United States - [2007 International Symposium on Bioinformatics Research and Applications](#)
2007 CA
- May 28, Kenya [Workshop on the Bioinformatics of African Workshop on the Bioinformatics of African Pathogens and Disease Vectors](#)
2007
- Jun 02, United States [FASEB Summer Research Conferences](#)
2007
- Jun 06, United States - [Third International Conference on Algorithmic Aspects in Information and Management \(AAIM'07\)](#)
2007 OR
- Jun 14, United King- [Animal Biotechnology and its Applications to Animal and Human Health](#)
2007 dom
- Jun 18, Italy [Computational and Statistical Aspects of Micro array Analysis \(V\)](#)
2007
- Jun 25, United States - [International Conference on Artificial Intelligence and International Conference on Bioinformatics & Computational Biology \(ICAI'07 + Biocomp'07\)](#)
2007 NV
- Jun 25, United States - [The 2007 International Conference on Bioinformatics & Computational Biology](#)
2007 Nevada
- Jun 25, United States - [The 2007 International Conference on Bioinformatics and Computational Biology \(BIOCOMP'07\)](#)
2007 NV
- Jul 25, 2007 Canada - AB [The Applied Computational Genomics Course](#)
- Jul 26, 2007 Austria [Probabilistic Modeling in Computational Biology meeting affiliated with ISMB/ECCB 2007](#)
- Jul 27, 2007 Russia [Moscow Conference on Computational Molecular Biology \(MCCMB'07\)](#)

** ISCB meetings found at http://www.iscb.org/events/event_board.php. This section will be dedicated to reporting regional meetings in the future.

In the next issue...

Some of the topics that have been started in this issue will be continued. Hopefully more contributors will report other projects they are engaged in as the newsletter continues to mature.

See you again soon.