

Establishment of “The South African Bioinformatics Student Council” and Activity Highlights

Candice Nancy Rafael^{1✉}, Jon Ambler², Antoinette Niehaus³, James Ross⁴, Ozlem Tastan Bishop¹

¹ Research Unit in Bioinformatics (RUBi), Department of Biochemistry and Microbiology, Rhodes University, South Africa

² Computational Biology Group, Institute of Infectious Disease and Molecular Medicine, Faculty of Health Sciences, University of Cape Town, South Africa

³ Centre of Excellence for Biomedical Tuberculosis Research/SA MRC Centre for Tuberculosis Research, Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, Tygerberg, South Africa

⁴ Faculty of Natural and Agricultural Sciences, Department of Genetics, Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria, South Africa

Competing interests: CNR none; JA none; AN none; JR none; OTB none

Abstract

The South African Bioinformatics Student Council (SASBiSC) in bioinformatics has been set up to increase the visibility of bioinformatics as well as to filter information to students within the field regarding job, funding and workshop opportunities as they arise. This is a short description of the process of setting up a national Student Council for Bioinformatics in South Africa, affiliating to the International Society for Computational Biology (ISCB). We also report two examples of activities that were carried out over the last two years that are: 1) participation in the SciFest Africa; and 2) the organisation of the first Bioinformatics Student Symposium. We hope that our experience and methods for the creation of SASBiSC and of collaborative communities can be useful to others who might want to do the same.

Establishment of the Student Council

The South African Society for Bioinformatics¹ (SASBi) was officially formed in September 2012 during a joint Congress with the South African Genetics Society (SAGS). Prior to this there was no official body to represent bioinformatic researchers and students in the country. The establishment of SASBi also led to the establishment of the Student Society as a platform for students to meet and discuss their research activities, but also to socialise and broaden their network of knowledge and friendships. A small group of students joined as volunteers to pioneer and set up a SASBi Student Council (SASBiSC). As a first step, one representative, selected from the attendees present at the first Joint Congress of SASBi and SAGS, was elected to the main SASBi Council.

The SASBiSC was then established during the biennial SASBi-SAGS Congress in September 2014, in Pretoria, with the election of the President (Candice Rafael), the Secretary (Antoinette Colic), the Media Officer (Jon Ambler), the Development Officer (James Ross), and of a Faculty Advisor/Mentor (Prof. Özlem

Tastan Bishop; first SASBi President). Students elected were voted onto the SASBiSC on the basis of their willingness to promote bioinformatics within the country. The geographical location of the students was also taken into account in a bid to get a fair distribution and representation of SASBiSC within the various institutions belonging to different countries present at the congress. The following provinces were represented within the SASBiSC: Gauteng, the Eastern Cape and the Western Cape.

The SASBiSC was modelled using the framework of the International Society for Computational Biology Student Council (ISCBSC) because one of our main goals was just the affiliation to ISCB and to become a Regional Student Group (RSG) (Macintyre *et al.*; 2013; Shanmugam and Macintyre; 2014). For a Student Council to be recognised as an ISCBSC, RSG requires the submission of various documents. First of all the composition of the SASBiSC committee, that would become the RSG committee, including the Chairperson, the Secretary and the Faculty Advisor/Mentor; the missions, objectives and goals of the RSG; the activity plan for the first year and the Constitution to govern and run the Council. The application has to be submitted to the ISCBSC for review; if the review is positive the

¹<http://sasbi.weebly.com/>

Article history

Received: 18 September 2017

Accepted: 08 January 2018

Published: 05 February 2018

© 2018 Rafael *et al.*; the authors have retained copyright and granted the Journal right of first publication; the work has been simultaneously released under a Creative Commons Attribution Licence, which allows others to share the work, while acknowledging the original authorship and initial publication in this Journal. The full licence notice is available at <http://journal.embnet.org>.

application is submitted to the main ISCB Council for approval. The SASBiSC was officially recognised as RSG for South Africa in 2015. Two conditions are mandatory: the ISCB membership of at least two committee members and of the Faculty Advisor, and the creation and adoption of a SC's Constitution².

Activities of the Student Council

The initial goal of the SASBiSC was to improve the communication between South African students interested in bioinformatics (Figure 1). This has been done through various communication tools such as the SASBiSC's website³, Facebook⁴ and Twitter⁵ accounts and a mailing list. These platforms have also been used for to give students the opportunity to make education and training experiences in other Institutes throughout funding and job opportunities circulated by the main SASBi Council as well as any other dissemination channel. The mailing list has been maintained and managed by the Secretary. The website and social media accounts have been managed mainly by the President and the Media Officer. However, all committee members have the possibility to access these media to increase the richness and visibility of the notices sent out. The SASBiSC has undertaken several projects, two of which are detailed below.

SCIFEST, AFRICA

SASBiSC was present at the national Science Expo (Scifest Africa) in Grahamstown in 2015 and 2016 with an exhibition desk. Scifest Africa, established in 1996, brings all levels of school pupils and teachers together with the aim of promoting public awareness, understanding of science, technology and innovation. This event is attended by thousands of learners from various schools around the country, looking for inspiration and potential career options, as well as representatives from various scientific organisations. The SASBiSC's aim at the event was to engage with the community for to increase awareness about bioinformatics as a research field and as a career choice for learners and teachers. Additionally, we aimed to interact with members of other scientific communities to grow relationships and encourage interdisciplinary communication and potential collaboration. These aims are in line with the directives outlined in the SASBiSC Constitution, as well as that of the ISCB Student Council.

Community Engagement

The SASBiSC exhibition desk included introductory movies about Bioinformatics and what it entails for the life sciences research, in several different languages:

²<http://sasbi.weebly.com/documents.html>

³<http://sasbistudents.weebly.com/>

⁴<https://www.facebook.com/SASBi-Students-446089572128356/>

⁵https://twitter.com/SASBI_students

these included English, isiZulu and isiXhosa⁶. With 68,000 visitors to the event in 2015 and 56,000 in 2016, we were able to engage with a large number of learners and teachers from many different areas and schools. Many of the visitors we talked to were very interested in learning about Bioinformatics, as it is a discipline that few of them had ever heard of before. Also educators from local secondary school were interested to learn about Bioinformatics, as most were not familiar with the field, and were excited about this new possible avenue they could bring to their students exploring different career opportunities.

Media Coverage and Engagement with other members of the scientific community

In addition to direct community engagement, SASBiSC was able to discuss and promote Bioinformatics on various other media platforms, including interviews and radio 'blurbs' on WITS Radio Academy, the local Grahamstown radio station, and a snippet in a local newspaper.

Further, the SC met and established relationships with representatives from the Square Kilometre Array⁷ (SKA), SA Innovation summit, Iziko, International Astronomical Union, and Southern African Association of Science and Technology Centres⁸ (SAASTEC) members, involved in the Science Centres. Many people expressed an interest to collaborate in future events for the promotion of Bioinformatics and the use of bioinformatic techniques in their own fields.

FIRST STUDENT SYMPOSIUM

The student symposium was a one-day meeting held alongside the joint Congress of SASBi and SAGS⁹ in Durban, South Africa, on the 20th September 2016. This was the first meeting of this type, and is planned to become a biennial or annual event. The main aim of this first symposium was to introduce students to bioinformatics research and job opportunities. The 35 student attendees at the symposium, mainly Honours and PhD students, were from bioinformatics and computational biology research groups in various fields and specialisations. For many of them this was the first time that they attended a conference. Nevertheless, they were able to interact with peers outside their own research labs. The symposium was funded with the support of generous funders including: the Bioinformatics Support Network¹⁰ (BSP), The Scientific Group¹¹, International Society for Computational Biology (ISCB) Student

⁶<http://bit.ly/2kK521O>

⁷<https://skatelescope.org/>

⁸<https://saastec.co.za>

⁹<http://sasbi.weebly.com/congress.html>

¹⁰<http://bio.chpc.ac.za>

¹¹<http://www.scientificgroup.com>



Figure 1. Student's Symposium group photo.

Council¹², The South African Society for Bioinformatics¹³ (SASBi) and a small fee from the participating students. The organisation was handled by the SASBiSC with the help of the organisers of the main conference, Anita Williams¹⁴, Nicolette Crozier and Robyn Jacob.

Keynotes

The first keynote speaker was Prof. Fourie Joubert from the University of Pretoria who was the second President of SASBi from 2014 to 2016. The second keynote speaker was Prof. Nicola Mulder from the University of Cape Town. They presented and discussed their current research activities and future plans, as well as some works that had inspired them in the field. Prof. Nicola Mulder ended the day with a brief presentation on potential job opportunities in academia and in industry, which was an inspiring way to wrap up the day's talks.

Student Presentations

In total, five students were selected for an oral presentation, whereas others were invited to present their work as posters. Among students selected for an oral presentation, some were visiting students from Germany. It was a privilege for us to invite them to present their research activities at the SC Symposium.

¹²<http://www.iscbsc.org>

¹³<http://sasbi.weebly.com>

¹⁴<http://www.conferencesandevents.co.za>

Indeed, this was a great opportunity for the country's students to learn about the research carried out outside their own labs, but also to learn about the scope of abroad research.

Award Winner

Each student's presentation was voted by attendees on the basis of different evaluation criteria on a marking rubric (Figure 2). Tobias Luttermann's talk was marked as the winning presentation and received a monetary prize for his excellent delivery and explanation of the research he had made and was hoping to do. The prize money was the remainder of the money secured from sponsors as well as the contribution from attending students once all the costs were covered.

Activities

The SASBiSC wanted to make the event more inclusive and not focused solely on research presentations, as the rest of the conference would centre on talks. We therefore incorporated a few smaller activities including an ice breaker, a mini hackathon, the Annual General Meeting (AGM) and a closing social event.

Icebreaker

Following the first keynote lecture and the first student presentations, a short icebreaker was held, just before the coffee break. This allowed students to feel more

SASBi Student Council Symposium 20 September 2016

Presenter Evaluation Marking Sheet

Evaluator: _____

Name	1	2	3	4	5	6	7	Total
Sebastian Spaenig								
Patrick Blumenkamp								
Gugu P. Mahlangu								
Arnold Amusereri								
Tobias Luttermann								

Criterion	Weight
1. Concise, accurate & up-to-date literature review	15
2. Knowledge gap and/or problem clearly identified and stated	15
3. Clear research hypothesis & objectives; Concise description of approach and methods	15
4. Results and discussion: interpretation of results and critical analysis of their meaning and impact	25
5. Summary of findings and future plans	5
6. Time management, visual media and speaker – audience contact	10
7. Ability of speaker to answer questions in a clear & meaningful manner.	15

Figure 2. Marking rubric used by each attendee to score oral presentations.

comfortable with each other, encouraging them to continue conversations during coffee and other breaks throughout the day. The icebreaker was modelled after others used before at ISCBSC Symposiums and termed “scientific speed-dating” (Grynberg *et al.*, 2011). This consisted of approximately 3-minute slots, during which students moved around the room and interacted with different students, learning about their research, areas of interest etc.

Mini Hack-a-thon

After lunch Jon Ambler presented the concept of the “hackathon”. Owing to the limited amount of time he was only able to introduce the idea and process and hold a very short interactive time, hence it becoming a “mini” hackathon. The main concept behind the hackathon is centered around collaborative research in short sprints towards a common goal. Groups of around five attendees were formed within the venue, with students using their own personal laptops and collaborating using a [Trello board setup](https://trello.com/)¹⁵. Each member within the group worked on a specific aspect such as reading the data in, converting the data, visualising the test set and reporting back to the main group. The attendees responded very well to the concept and many were excited to return to their respective labs to try out the concept. Many had to be pulled away for the coffee break as they wanted to continue longer working on the test project. Overall, it was very successful and will hopefully lead to many collaborations in the future.

¹⁵<https://trello.com/>

Annual General Meeting

Following the final keynote lecture, we moved straight on to the AGM with all the students present as they would form the main body the SASBiSC would ultimately serve. This was the first AGM since the SASBiSC was officially formed in Pretoria on September 2014. Here the SASBiSC reported on the activities it had undertaken during the past two years, including becoming an official RSG under the ISCBSC, hosting a stall at a local science festival, developing an online and social media presence, holding a film competition and finally organising the student symposium. Attendees gave ideas and suggestions for the future years of the SASBiSC which were reported by the Secretary for consideration and implementation where necessary by the new incoming Committee. Finally, the new Council was voted in and the Symposium officially closed with thanks to the sponsors, keynotes, organisers and volunteers, and attendees.

Closing Social Event

A closing social event was generously sponsored by The Scientific Group. This was hosted at The Market Outdoor Restaurant and gave the students a chance to interact in a relaxed, social environment, and network with student attendees from around the country and from abroad. It was a great end to a successful day that was the result of many months of work.

Difficulties and challenges experienced

The main difficulties faced by the SASBiSC were communication and funders. Because Bioinformatics is still an emerging field in South Africa, many students and researchers never heard about it yet. This leads people to be reluctant in to get involved with events surrounding it. On the one other hand, funders like to see a track record and history of previous successful events which is difficult to show for a new organisation like SASBiSC that is just trying to establish itself. We overcame this difficulty by showing the capabilities of the Committee and the work it had made outside of the SASBiSC before its establishment. A well set up and a clear proposal for the event including the budget helped us to convince sponsors to fund our initiatives. Hosting a successful SciFest event and sending follow up reports including registers and photographs helped secure funders for the event.

Many students and educators admitted they had never heard about Bioinformatics and this made the recruitment of new students in the SC even more difficult. Communication between research groups within the country is limited and therefore the distribution of information is often difficult. Many announcements for funding opportunities, academic or job positions and workshops often do not reach the wider community that would benefit from such notices. The creation of the SASBiSC web portal and social media platforms will hopefully help with this in the future. However, there is still the challenge of acquiring the notices and calls to place on these sites.

Conclusions

A substantial amount of work was accomplished in these two years of the SASBiSC's existence. The framework is now in place, and on it future activities will be built. The activities of the SC will be continued by the new committee and perhaps enlarged by introducing new events and activities. The first Symposium was new to many students who had not attended any similar event before and therefore did not know what to expect. Through advertising and repeated posting via SASBi and University mailing lists as well as social media announcements, we were able to reach many students and to build a database of contacts in the field within the country. Suggested future projects are the organisation and hosting of workshops focused on bioinformatics techniques; as well as collaborations with larger bodies including BSP and the [Centre for High Performance Computing](http://www.chpc.ac.za)¹⁶ (CHPC) in order to bring forward to them needs in terms of training. In future events or symposiums, it could be beneficial to team with fellow RSGs within the African continent to host a collaborative international symposium. The members of the SC gained experience during their time on the Council

¹⁶<https://www.chpc.ac.za>

through the various tasks and events undertaken. The members got to experience aspects involved in; large scale event organisation, communication (not only with fellow academics but also with the local and national community), marketing and proposal writing in the attempt to acquire funders and sponsors, and finally in the form of community building and networking for future collaborative work. We would also like to encourage the establishment of similar student groups that have the benefit of fostering skills that are otherwise often considered vocational, including interpersonal skills, communication, marketing, project management and community building. Within the academic environment these skills are often under-recognised, and yet can be exceptionally beneficial for effective and efficient establishment of bioinformatics.

Key Points

- Establishment of the first Student Council for Bioinformatics within South Africa.
- Affiliation of the South African Society for Bioinformatics Student Council (SASBiSC) to the International Society for Computational Biology (ISCB).
- Organisation of the first Student Symposium for Bioinformatics and Computational Biology.
- Presentation of bioinformatics as a field of study and as possible career avenue to young learners and educators.
- Emphasise the benefits of student run and motivated organisation within a scientific field.

Acknowledgements

The Student Council would like to acknowledge the following bodies for funding our various initiatives: Bioinformatics Service Platform (BSP), The Scientific Group, International Society for Computational Biology (ISCB) Student Council, South African Society for Bioinformatics (SASBi). Our acknowledgments also go to Anita Williams, Nicolette Crozier and Robyn Jacob for all their help in the organisation of the Symposium.

We would also like to thank the ISCB SC for the help and advice leading up to the events, setting up the RSG and advice regarding general Council running queries. Thanks also go to SASBi for providing a travel fellowship to assist the Council in attending the Symposium.

References

1. Grynberg P, Abeel T, Lopes P, Macintyre G, Pantano Rubiño L. (2011) Highlights from the Student Council Symposium 2011 at the International Conference on Intelligent Systems for Molecular Biology and European Conference on Computational Biology. *BMC Bioinformatics* **12**: A1.
2. Macintyre G, Michaut M, Abeel T (2013) The Regional Student Group Program of the ISCB Student Council: Stories from the Road. *PLoS Comput Biol* **9**(9): e1003241. <https://dx.doi.org/10.1371/journal.pcbi.1003241>
3. Shanmugam A, Macintyre G (2014) Establishing and Managing a Global Student Network. *PLoS Comput Biol* **10**(10): e1003920. <https://dx.doi.org/10.1371/journal.pcbi.1003920>