A typical day in the course begins with a 2 h lecture in the morning from an invited speaker chosen by the module directors to complement the work being done in the lab portion of the course. A subset of the students joins the speaker for lunch in the dining hall. All students return to the lab after lunch to begin the experimental work for the day, which usually lasts well into the evening. Between experiments, the students wander in and out of the break room where they interact informally with that day's speaker and the speaker for the next day. Lunch and breakroom time with visiting lecturers are two of the many informal networking opportunities available to the students; many a postdoc have been arranged in the BoP break room in the wee hours of the morning.

When did you first become involved with the course? What motivated you?

Similar to many former BoP course directors, we were both students in one of the MBL Discovery courses and have participated in the BoP course over the years as lecturers and module directors. Both of us are committed to teaching the next generation of scientists and believe that BoP course is a uniquely effective way to engage some of the best and brightest students and postdocs in parasitology research and connect them with the larger parasitology community. It is fun and rewarding for us and all who have served as course faculty to follow the great things that these students go on to do in their careers.

What are the criteria for student selection?

Admission into the course is competitive. Applications are reviewed by a committee of current and former course faculty. The committee reviews the applications for research experience, strong letters of reference, a personal statement that makes a good case for how the candidate will benefit from the course and a clear commitment to parasitology research. We strive to admit a class that is diverse in every sense of the word, including geographic diversity and diversity of research interests/organisms. It is almost always a very international class.

We admit 16 students per year, typically mid- to late graduate students and postdocs. We occasionally admit more senior applicants; for example, two years ago we admitted a junior faculty member who was looking to move his research focus from nematode-insect interactions to parasitic worms of humans and other vertebrates.

There has been a lot of discussion on the needs and attitudes of students towards education and the best pedagogical approaches to address them. How has BoP dealt with these challenges? Are there any examples of success you would like to share?

Active learning plays a very big part in this course; the students spend many hours in the lab, learning by doing. They work alongside experts in the field, using state of the art equipment to address real problems in parasitology research. This is a major part of the excitement and attraction of the course, both for the students and the faculty: these are not lab exercises, these are real experiments asking important questions, the outcome of which is not known by anyone at the start of the module. The module directors set the general parameters of what will be studied, but within that context the students have a lot of flexibility to design their own experiments or take them in new and interesting directions. This is why MBL calls BoP a 'Discovery Course'.

The quality of the research done in the course is reflected in the many papers subsequently published in which BoP students are acknowledged for having generated the idea or the preliminary data that led to the published study. In terms of the students themselves and the effect the course has had on their careers, a recent survey of course alumni from the last decade revealed that 56% of respondents considered their experience in the course 'transformative'. 26% of the BoP alumni are currently finishing up their doctoral studies, 45% are postdoctoral fellows and 23% are faculty members at academic institutions.

What is the secret to the success of BoP?

Bringing bright, motivated students together with established leaders and rising stars in the field, and providing them with a stimulating but informal setting for scientific interaction. This environment encourages students to ask questions, challenge ideas and engage intellectually with the faculty and one another. The faculty are committed to a high level of engagement with the students and they organize experimental modules to be flexible and incorporate new ideas that arise during their time with the students. The informal interactions that take place between students and faculty extend to interactions with the broader MBL scientific community. The MBL is a special place to be in the summer: there is an atmosphere of scientific engagement and excitement from which everyone benefits.

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Science & Society

Promoting Science in Secondary School Education

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Engaging secondary school students with science education is crucial for a society that demands a high level of scientific literacy in order to deal with the economic and social challenges of the 21st

century. Here we present how parasitology could be used to engage and promote science in secondary school students under the auspice of a 'Specialist Centre' model for science education.

Why Do We Need to Promote STEM Education at Schools?

The secondary school years are a pivotal period for the motivation and preparedness of students to pursue careers in science, technology, engineering, and mathematics (STEM). Given that students' interest in science declines in secondary school [1], motivating students to become competent and engaged in STEM subjects that are relevant for their everyday lives is an important goal, so they can be better citizens and decision makers. In the last decade, there have been many national and international initiatives to strengthen economic competitiveness through the promotion of STEM education. For example, in 2009, US President Obama announced the 'Educate to Innovate' campaign to motivate and inspire students to excel in STEM subjects (https://www.ed.gov/stem). Similarly, the Education Council of Australia developed the National STEM School Education Strategy 2016–2026 to lift student engagement and attainment in STEM and to support teachers to improve student outcomes (http://www.scseec.edu.au).

Science teachers and the scientific community have an important role in promoting science and raising its profile with young people, particularly by increasing student participation, motivation and success. This can be encouraged by mobilising professional scientists and engineers to support STEM subjects at schools and inspire students by showcasing the role of science in solving real-life problems in an interesting, thought-provoking, and engaging way. A number of approaches can be used to promote STEM education in schools. Here we present a 'Specialist Centre' approach using parasitology to promote science among school students.

How Parasitology Can Promote Science in Schools Using a 'Specialist Centre' Approach

Parasitology integrates diverse and interdisciplinary fields of knowledge, and the importance of parasitology to health, society, and the economy [2,3] can engage students by contextualising science education [4]. Parasitology can be used, for example, to explore issues such as climate change by demonstrating invasion of parasites into new geographical zones [5]. Thus, the intricate life cycles of parasites can be used as a fascinating 'hook' for teaching broader principles in biology [6]. Teaching parasitology does not demand rewriting curricula, rather it embraces the way many aspects of parasitology are compatible with existing science curricula.

In the last decade, we have used parasitology to teach science to school students under a 'Specialist Centre' model. The Gene Technology Access Centre (GTAC, www.gtac.edu.au) is one of six science and mathematics Specialist Centres funded by the Victorian (Australia) government Department of Education and Training (DET). The Specialist Centres share a commitment to providing rich learning experiences in STEM subjects for all Victorian school students. This is achieved through students' access to state-of-the-art facilities to participate in programs crafted by educators in partnership with research scientists. GTAC is purposely staffed and resourced to serve as the nexus between the scientific and education communities.

Here, we focus on GTAC onsite student programs which are developed based on interactions among students, scientists, and educators to promote science using parasitology (Figure 1). We outline three educational programs for students of Grades 10–12 that illustrate the utility of the Specialist Centre model, and these are delivered by GTAC in partnership with the Victorian branch of the Australian Society for Parasitology (ASP, parasite.org.au).

'Parasites in Focus'

The 'Parasites in Focus' program for students of Grades 10–11 was initially developed as a component of the outreach activities of the 12th International Congress of Parasitology held in Melbourne in 2010, and is now an annual full-day event. As an opportunity to raise the public profile of parasitology, the program begins with a presentation from an established research scientist who introduces the field of parasitology and discusses the global medical, economic, and social impacts of parasitism. Students then participate in three laboratory workshops to solve scenario-based problems. Firstly, students use microscopy and methods in veterinary pathology to diagnose a sheep nematode (e.g., *Haemonchus* – Barber's pole worm). Secondly, students apply molecular techniques to identify *Plasmodium* spp. infecting a human patient. Thirdly, students use computer-based simulations to predict the efficacy of parasitoid wasps as a biological control of an orchard pest, the light brown apple moth. 'Parasites in Focus' therefore exposes students to a variety of technologies, disciplines, and prospective STEM careers.

One of the most crucial attributes of GTAC laboratory workshops is the opportunity for school students to work in small groups ($n = 6$) with a scientist mentor, who is undertaking postgraduate studies in science. Working in small peer groups creates a cooperative and inclusive learning environment in which every student participates [7]. At GTAC, mentors are coached in pedagogical skills for dialogic teaching [8] to encourage students to explore complex ideas and construct knowledge collaboratively. The mentor acts not only as a guide for the students but also as a role model. As the human