

Title: ENGAGING THE PRIVATE SECTOR AND ENHANCING OUR GRADUATE EDUCATION AND POSTDOCTORAL TRAINING CORE

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Within the Jefferson College of Biomedical Sciences (JCBS) at Thomas Jefferson University, we have several initiatives whereby we collaborate with both internal University as well as external partners, both academic and private sector, who bring their professional expertise to enhance a variety of didactic as well as experiential activities that broaden our curricular, co-curricular and extra-curricular portfolio for our graduate students and postdoctoral scholars (collectively hereafter trainees). Through these activities, our trainees are provided with real-world opportunities to apply their knowledge base and skill sets beyond the academic research bench, to enhance related professional skills, and to expand their career network.

As we have created these initiatives and opportunities, we have looked for ways for these trainee activities to be sustainable. One successful way has been to incorporate them within the framework of a graduate course that becomes established as an approved component of the graduate curriculum. Establishment of a for-credit course addresses the ongoing challenges on the part of trainees and faculty alike, including the perception by some that any activity not directly related to traditional science education and training, no matter how important and relevant to a trainee's ultimate career, may be seen as a distraction from their core curricular studies and laboratory research. Establishment of such activities as official courses provide an imprimatur not otherwise afforded by "extracurricular" avenues. Furthermore, establishment as a credit-bearing, tuition-charging course will provide for future sustainability from an institutional fiscal perspective.

One example started from a program funded by the 2012 Burroughs Wellcome Fund's Career Guidance for Trainees grant program, titled "Mentored Teaching Experience in Health Professional Courses." Along with a semester-long mentored teaching experience at the Community College of Philadelphia, the selected trainees also attended two journal club style courses, "Principles of Pedagogy" and "Principles of Science Pedagogy." After the year-long grant, these courses were submitted and approved as JCBS credit-bearing, tuition-charging courses while the course director became an adjunct faculty member. These courses have had strong enrollment since their inception.

Another example began in the 2015-16 academic year with a collaboration between JCBS and Jefferson's Innovation Pillar/Jefferson Accelerator Zone (JAZ). We co-sponsored a series of guest speaker seminars and discussions, including biomedical science start-up founders and CEOs, venture capitalists, and other entrepreneurs, which was open to the Jefferson community with the hope of fostering collaborations between clinicians, researchers, nascent inventors, entrepreneurs and trainees. Around this, we created a new graduate course entitled "Innovation Engagement" for which trainees can register for academic credit based upon attendance, discussion participation, and writing of reflection papers.

While several of these courses reside within our Professional Science Master's (PSM) MS programs, and MS students are required to select at least two such "professionalism" courses as electives, the courses already attract both MS and PhD students as well as some postdocs. Our next challenge is to include a variety of them in the core curricular studies for our PhD students.

One PSM elective course in particular has been a springboard to other activities by and for our trainees. “BioVenture Management” is co-taught by adjunct faculty, including JCBS alumni, biomedical scientists, entrepreneurs, and venture capitalists from the private sector. In 2012, a JCBS MD/PhD student who took this course and his PhD student labmate founded the Jefferson student organization, the Business and Biotechnology Group (BizBio). BizBio engages trainees, faculty and staff across Jefferson’s entire spectrum of health science training to explore the interface of biomedical science, healthcare and the business world, to help them develop skill sets for such careers, and to cultivate a network of innovative individuals within Jefferson and the greater Philadelphia area. In addition to organizing Career Spotlight Seminars and regular networking events, BizBio members participate in business plan competitions and hackathons, such as the Neuro Startup Challenge, the Nanotechnology Startup Challenge in Cancer, the Jefferson Accelerator Zone “JAZ” Tank (similar to Shark Tank), and the Independence/Jefferson Health Hack.

The international Startup Challenges were created and are organized by The Center for Advancing Innovation, Inc., and feature inventions from the NIH that are available to be commercialized. Over the past two Startup Challenges, there has been a Jefferson team containing at least 2 BizBio members. This participation met the requirement that at least two members of each Challenge Team must be enrolled as active graduate students in a University, or, alternatively, can be a postdoc or medical resident. In addition, at least one external advisor has been a JCBS alumnus or adjunct faculty member, and all JCBS student team members have taken “BioVenture Management.” Team members have expressed that this course was invaluable in giving them a start in these Challenges as well as having connected them with JCBS alumni and adjunct faculty who became advisors. The Jefferson BizBio team was a semi-finalist in the Neuro Startup Challenge and a finalist in the JAZ Tank while the team in the Nanotech Startup Challenge in Cancer was one of ten winners. They have founded “Precision Nanotech”, officially incorporated it in PA last year, were finalists in The Association of Women Entrepreneurs Pitch Program in Philadelphia, and pitched in the business plan competition at the JAZ Tank finals in April 2017.

Additionally, BizBio and JCBS are developing collaborations with private sector partners from capital investment firms and startup companies to provide short-term consulting opportunities for our trainees. They will assist with scientific merit analysis of investment opportunities and other short-term problem solving experiences.

These curricular, co-curricular and extra-curricular activities are modernizing our graduate education and postdoctoral training. They are providing solutions to include more of these activities into our core curriculum through new courses. Our new courses and student organizations have been a springboard for a wide range of experiential opportunities both within Jefferson and with external private sector partners. We look forward to creating more structured, sustainable opportunities that will become part of our core for both graduate education and postdoctoral training with a long-term impact.