NIH BEST Awards

Future of Bioscience Graduate and Postdoctoral Training Meeting

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NIH Program Overview

Broadening Experiences in Scientific Training (BEST)

Success of the entire biomedical research enterprise relies on the creativity, innovation, and dedication of the scientific workforce. There is ongoing concern that the long training time and the declining percentage of PhD graduates that obtain independent academic research positions are making biomedical research a less attractive career. Additionally, although many graduates are moving into essential research-related occupations rather than research-intensive positions, many current training programs do little to prepare trainees for these other career options. The NIH is committed to supporting a sustainable and robust workforce equipped to address the greatest challenges and opportunities in biomedical research, recognizing that traditional research-intensive positions are not the only means by which PhD graduates can meaningfully contribute to the biomedical research enterprise. To address this need and based on recommendations from the Advisory Committee to the Director (ACD) Working Group on Biomedical Workforce, the Common Fund launched the “Strengthening the Biomedical Research Workforce” program as one component of a trans-NIH strategy to enhance training opportunities for early career scientists to better prepare them for a variety of career options in the dynamic biomedical workforce landscape.

NIH Director’s Workforce Innovation Award to Enhance Biomedical Research Training.

These awards, also called the Broadening Experiences in Scientific Training (BEST) awards, are providing support for institutions to develop innovative approaches to complement traditional research training in biomedical sciences. Institutions are encouraged to partner with industry or other entities to provide a wealth of diverse training opportunities for their trainees, and the awardees have formed a network to share experiences and determine best practices. One of the novelties of this program is the NIH cross-site evaluation of all the programs. The desired impacts of the program include: 1) enhancing trainee agency to make career decisions, 2) reduced time to desired, non-training, non-terminal career opportunities and reduced time in postdoctoral positions, and 3) the creation and/or further development of institutional infrastructure to continue the BEST-like activities. This rigorous analysis will assess impact at the home institutions, and proven approaches will be widely disseminated throughout the training community.
The Atlanta BEST Program

**Principle Investigators:** Nael McCarty, Mary Delong, Wendy Newstetter, Lisa Tedesco, Keith Wilkinson

**Key Personnel:** Cora MacBeth (Program Director), Tamara Hutto (Program Manager)

The Atlanta BEST Program (NIH 1-DP7-DE024096) is designed to reshape the preparation of the biomedical workforce, in part by preparing biomedically trained PhDs for careers outside of academia. It represents a joint effort by the two leading producers of biomedical research trainees in Georgia: Emory University (a private institution) and the Georgia Institute of Technology (Georgia Tech, a public institution). Key components include career exploration and professional development programming for doctoral students and postdoctoral trainees. Faculty approaches to mentoring and innovative curriculum changes are also part of the BEST mission to aid research universities in training the scientific workforce for the array of professional occupations available to well-trained scientists.

One among 17 programs across the US, the Atlanta BEST program is uniquely designed in a cohort style. Cohorts mean that there are groups of trainees who are building the basis of this culture change through community building and peer mentoring. Trainees interested in the program apply online, answering questions that provide an understanding of the breadth and scope of their interest in learning about non-academic career options. Applications are screened by the BEST program leadership, who also take into consideration the applicant’s progress in their research program and his/her progress toward the degree, if a student, keeping in mind the goals of not allowing involvement in the BEST program to substantially extend tenure as a grad student or postdoc. Included in the application process is the provision of a letter of support from the applicant’s principal investigator. This is essential, because we want the trainees to be able to commit the required amount of time to participation in the BEST program, without having to worry about doing this behind their PI’s back. In some cases, this forces the initial “difficult conversation” between trainee and trainer regarding the trainee’s interests in non-academic career options. In addition, since we seek to engage faculty in providing better mentoring around the breadth of career options, having the PI write a letter of support brings them into the cohort of faculty that are committed to this enterprise. The BEST program seeks to recruit approximately 30 new trainees each year. This number is kept low so that we can build community and peer-mentoring activities that would be less effective with larger numbers. However, only some of the activities sponsored by the BEST program are available only to BEST trainees in the cohorts – many activities are offered more openly to the broader pool of trainees across our two institutions.

The training that these BEST cohorts receive give them a broad range of foundational knowledge and skills, including those related to the legal side of science, collaborative translational science, drug discovery, regulatory science, clinical innovations, and communication to broad audiences such as policymakers, K-12 educators, and the general public. The Atlanta BEST Program takes advantage of a full range of relevant activities at
Emory and Georgia Tech and in the Atlanta biomedical community at institutions such as the federal Centers for Disease Control and Prevention, and members of the pharmaceutical and medical device industries.

This effort aims to transform the culture of training – in both a top-down and bottom-up approach – by creating new opportunities for both the trainees and the training/mentoring faculty. For the trainees, we admit one cohort of 20-30 trainees per year (both predoctoral and postdoctoral, half from each institution). Each trainee is appointed to the program for two years, although they are encouraged to be involved throughout their training. Faculty activities initially target the Principal Investigators/advisors of those trainees, plus leaders of all of the biomedical research-based graduate programs from the two universities and other members of the training faculty who are supportive of the career development of biomedical researchers. Ultimately, the goal of the Atlanta BEST Program is to establish, implement, and assess innovative approaches and activities to broaden and complement traditional research training in the biomedical sciences.

**Aim 1:** To expose trainees to a broad variety of career pathways beyond academia. During year one of the Program, trainees receive individualized career mentoring and leadership training. Goals of this year are to: 1) generate trainee self-awareness that influences career choices; 2) develop the trainees’ team building and leadership skills to facilitate career success; 3) connect the trainee through formal and informal networking to other members of their chosen career path; and 4) provide an accessible, multilevel mentoring program and a cadre of experts in various career paths. Year one of the BEST Program is structured in small group activities that facilitate community and team building, exercise of leadership, peer mentoring, and executive function.

**Aim 2:** To provide trainees deep immersion into a specific career pathway beyond academia. This involves experiential activities and part time internships associated with a specific “Track.” Each trainee selects one of the six Tracks that include: Entrepreneurship & Business; Science Communication & Public Policy; Education & Outreach; Tech Transfer & Intellectual Property; Government & Nonprofit Research & Research Administration; and Biotech/Pharma Industry Research & Management. A part-time internship relevant to that track will be undertaken, taking advantage of the rich opportunities that exist in Atlanta.

**Aim 3:** To better equip faculty at Emory and Georgia Tech to train graduate students and postdoctoral fellows for the 21st century workforce. We are developing opportunities for faculty to facilitate the preparation of trainees for a wider array of research careers, and thereby also broaden their outlook and connections.

Further details of the program, including the current schedule of events and issues of the trainee-led newsletter, can be found at: [http://gs.emory.edu/sites/best/index.html](http://gs.emory.edu/sites/best/index.html).
The concept of a feedback loop is fundamental to effective and efficient regulation of biological systems. BU's BEST program has applied this principle to the training environment such that we will examine the biomedical job market with the goal of informing our curriculum development. By responding to market needs and requirements, our curriculum will then provide targeted training to meet a diverse and dynamic job landscape, thereby completing the feedback loop.

To accomplish real-time market analysis we have teamed up with our outside partner, MassBioEd to utilize state-of-the-art software, Labor/Insight, offered by Burning Glass Technologies. The technology queries over 6 million on-line postings for the identification of available jobs and job trends. Importantly, Labor/Insight will also identify specific skill sets required to pursue the career paths. Reports can be generated with a focus on specific disciplines, geographic areas or skill sets of interest. We are excited about the possibility of working with other institutions to generate reports of interest to all in the community. The information we glean from the reports, combined with that garnered from our network of alumni, industry partners, university colleagues and advisory committees, will be used to craft the curriculum and thereby facilitate trainees’ exploration and preparation for careers coveted by the scientific community.

As a companion to Labor/Insight, we will work with Burning Glass Technologies to develop a novel software tool, called Focus/Career, with the trainee as the target user. Relying on the vast database of job listings utilized for the Labor/Insight searches, Focus/Career will allow the trainee to explore career options and skills required to attain a specific career, based on information gathered from the job market. We will couple this new software with a strong advising and mentoring network that includes faculty, administrators, alumni and industry partners. Trainees will explore different career track options through Focus/Career, in conjunction with a series of career panels, workshops, seminars, and professional development courses. Trainees will hone their skills through additional workshops, seminars, discipline-specific coursework, including hybrid online courses, and shadowing experiences. Finally, BU’s BEST will provide opportunities for trainees to experience a given career prior to entering the job market. Internships will be facilitated by our leadership team for real-world experiences. Our external partner, Ms. Lauren Celano, CEO of Propel Careers, will provide career coaching to trainees at all stages of the program.

Finally, we will strive to further enhance a university culture that supports and engages this new market-informed curriculum. An essential part of our plan is to use strategies that specifically target barriers to attaining and sustaining success. We will provide faculty with information in the form of workshops, seminars and hybrid online learning modules.

In summary, BU’s BEST will take a unique approach to training the future biomedical workforce by considering re-engineering the employment pipeline as a classic feedback loop whereby the market informs the curriculum and the curriculum selectively targets preparation for the market.
Key Personnel: Avery August (PI), Chris Schaffer (Co-PI), Susi Sturzenegger Varvayanis (Senior BEST Director)

BEST Program Highlights

Rethinking training for Cornell STEM graduate students & postdoctoral scholars…why? Because a majority of us will end up working beyond academia.

Science Policy Bootcamp: from concept to conclusion, a course developed by co-PI Chris Schaffer. During the course small student teams identify a key science policy issue, thoroughly research the issue, formulate a detailed plan to address the issue, and implement their plan for solving the problem toward the end of the term. The course requires a tangible policy-making outcome; examples include producing technical reports and analysis, drafting legislation, commenting on Federal or State rulemaking, writing legal briefs to support legal action, launching public outreach campaigns, or raising press awareness of an issue. Through active research and advocacy work the unique approach will help train a generation of scientists who are both passionate about and effective in engaging policy makers to solve some of our biggest problems including energy, climate change, health care, and education.

The Pre-Seed Workshop (PSW) is a hands-on fast paced two and a half day event to evaluate early university research inventions to determine potential paths forward to commercialize the idea. BEST trainees on each Pre-Seed Workshop team assist in all aspects of commercial assessment of the high tech ideas. A hand-picked multi-disciplinary team of regional experts in business, technology transfer, intellectual property law, regulatory affairs, finance, or marketing are assembled around scientists and engineers from the life sciences, physical sciences, IT and beyond. Guided by experienced entrepreneurial coaches, the teams work through the twenty questions one needs to ask before deciding to commercialize a new high-tech invention. Each idea champion then presents to a panel of experts from venture capital and angel investment groups who give constructive feedback on what the team should address in the near and long-term to assure success. The PSW, as part
Trainees can opt for a single pathway (through workshops, courses, customized “BESTernships”) and/or sample each of the pathways in less detail (primarily through lectures). **Trainee initiated project experiences** are encouraged, subject to program staff approval and available funding.

The **Finding your Scientific Voice** presentation workshop (6 three-hour sessions) uses improvisation, physical and vocal exercises, and multiple presentation assignments to help trainees acquire skills needed for constructing effective scripts for professional contexts, including the elevator pitch, media interviews, chalk talks, formal conference presentations and job interviews. Developed through support of the BEST Program, the format incorporates full video recording, peer assessments and individualized instructor feedback to develop trainee skills to incorporate humor, read their audience, and connect with listeners. Additional benefit comes from participants emanating from disparate disciplines such as plant breeding and genetics, applied and engineering physics, crop and soil sciences, pharmacology and biomedical sciences. Three separate shortened versions (one three-hour session) of the workshop are being deployed for faculty, postdocs and graduate students.

The **Business as a Second Language (BSL)** minicourse was developed by the BEST Program to fill the gap for scientists and engineers who want to take Johnson Graduate School of Management courses, but lack the background and vocabulary to integrate smoothly. BSL is a seven week immersive case-based broad spectrum overview of key business topics, aimed at helping participants decide which areas within business they would like to continue learning about, regardless of career aspiration. From finance and accounting methods (how will you set up your own consulting business?), profit and loss statements (how to evaluate job offers from two companies), negotiating skills, and assembling a team from a business and management perspective, trainees are exposed to scientific case studies to emphasize and immerse the student in business and managerial principles. Trainees form interdisciplinary teams, research market needs and prepare a business case, complete with a presentation of their high-tech solution.

[www.BEST.cornell.edu](http://www.BEST.cornell.edu)  
Contact: Susi Varvayanis [sv27@cornell.edu](mailto:sv27@cornell.edu)
Title: MSU BEST: Integrated Biomedical Training for Multiple Career Options

Institution: Michigan State University, East Lansing, MI

PI: Stephanie W. Watts (Professor of Pharmacology, Assistant Dean in The Graduate School)

Key personnel: Katy Luchini Colbry (Director for Graduate Initiatives, College of Engineering), Kevin Ford (Professor of Psychology and Program Evaluator), Karen Klomparens (Dean of The Graduate School), Manoochehr Koochesfahani (Associate Dean for Graduate Studies, College of Engineering), John LaPres (Professor of Biochemistry, Director of the Biomolecular Science Interdisciplinary Graduate Studies Program), Julia McAnallen (Director of Graduate Career Services), Richard Schwartz (Professor of Microbiology and Molecular Genetics and Associate Dean for Graduate Studies, College of Natural Science); Julie Rojewski (MSU BEST Program Manager)

The Michigan State University BEST Program is designed to be a multi-year co-curricular program for biomedical graduate students and post-docs that targets education in both skills and experiences around expanded career options. MSU makes the contribution to BEST in focusing on student self-efficacy around professional competencies that transcend discipline and career. By focusing on engaging and empowering individual trainees to develop the skills and experiences they can use to pursue a variety of career paths, the MSU BEST program model could be adopted by institutions that are not located in heavily industrialized areas.

Audience: The MSU BEST program is open to all Ph.D. students and post-docs in biomedical and biomedical engineering disciplines. We particularly aim to engage early career graduate students so that professional development skills will complement and support their disciplinary training. We invite faculty to join in this career training and provide their trainees with parallel mentoring in professional career development in their research labs so that students are receiving consistent messages and support from the BEST community and their mentors around the value of career preparation for a variety of potential fields.

In its first year, MSU is testing a small cohort model. We seek to build a BEST community that can provide engagement and support among trainees, their mentors, and the BEST team. Further, MSU is located in an environment which is not deeply populated with externship providers, and we are focused on creating meaningful, engaged externship experiences between BEST trainees and experience providers, so are potentially limited by available opportunities in the area.

Program Design: MSU has a long history of providing innovative and comprehensive professional development to graduate students which complements disciplinary training. MSU BEST integrates these established strengths and builds upon them to offer students a pathway toward developing key professional competencies to complement their deep content knowledge. Year 1 begins with a self-analysis of professional strengths and weaknesses using a unique, MSU-developed online platform, Career Success. This portal offers students the chance to assess career skills and interests, develop their own professional portfolio, explore career resources and professional development opportunities, and map out goals for each stage of their graduate careers. This system draws upon MSU's widely-recognized PREP model, which promotes for students Planning, Resilience, Engagement, and Professionalism, and guides trainees through skills development in professional readiness, wellness, teaching, conflict resolution, ethics and integrity and other key areas for success in graduate school and future
MSU BEST builds upon another of MSU’s proven strengths: integrating wellness as a core foundation upon which professional success is built. The MSU Wellness model incorporates six key areas of personal health and self-care: Physical, Emotional, Spiritual, Intellectual, Occupational and Social. MSU BEST embeds wellness themes early and throughout the BEST program, because research has shown that stress can be a major contributor to graduate student attrition and difficulty in finding a path to a career. We seek to make BEST trainees aware of resources available to support their personal well-being and help them develop resilience to succeed at MSU and in their future careers.

Finally, MSU BEST is working with campus and national partners to develop a curriculum in two other foundational “Spheres of Success:” Teamwork and Communication. These two areas have been deemed by the BEST leadership team as essential professional competencies. Collectively, these foundational skills will be put to test when trainees undergo their externships. The first year is capped with a trainee writing a BEST IDP with their mentor and a team member from BEST.

**Externships:** In year 2 and beyond, BEST trainees will participate in externships. The MSU Externship Model promotes five (5) career spheres: Innovation, Legal, Regulatory, Government and Public Affairs, and Academe. BEST trainees pick two areas of particular interest and engage in an externship in each of those areas. Trainees identify these two areas by being exposed to each of these five areas in independent workshops in year 1. It is our belief that careful design of the externship experience will permit BEST trainees to engage their professional and disciplinary skills in new ways, learn about employers outside of their labs and outside academe, and develop experiences that will translate to a variety of possible career options.

**Evaluation:** We will compare outcomes between highly engaged BEST Trainees/Scholars (test group) and trainees not engaged in BEST (control group) to determine if the activities provided by BEST caused discernable changes in attitudes, skills, and confidence of students and post docs in exploring expanded career options. We propose the use of strong interventions such that outcomes are measurable and comparable, and via formative and summative assessments, we will track change throughout the program. Our ultimate goal is one of culture change in scientific graduate training, such that BEST program goals become integrated into biomedical training, where skills development relevant to non-academic careers becomes integrated and supported as part of biomedical training. We hope to build with the 16 other BEST cohorts a model with variations that can be adopted by the many programs that wish to build graduate and postdoctoral professional development around expanded career outcomes.
Program Title:
New York University Scientific Training Enhancement Program (NYU-STEP)

Institutions:
New York University at Washington Square & New York University Medical Center

Co-Directors:
Keith Micoli, Ph.D., Director of the New York University School of Medicine Postdoctoral Program
Christine Ponder, Ph.D., Director New York University Office of Postdoctoral Affairs
Carol Shokes Reiss, Ph.D., New York University Professor of Biology and Genomics

Program Summary:
The New York University Scientific Training Enhancement Program (NYU-STEP) seeks to improve the career training of postdoctoral and graduate trainees. NYU-STEP seeks to engage them early in actively planning their own careers, assessing their personal values and translating those into individual goals, all while introducing them to the diverse career opportunities that will await them should they decide to leave academic research. In the first phase, trainees are encouraged (or required in some cases) to participate in a course to complete their Individual Development Plan (IDP) and provide an introduction to the NYU-STEP program. The IDP Course provides an introduction to the four broad career tracks defined by NYU-STEP; For-Profit Industry, Government and Non-profit; Communications; and Academia, broadly defined. Phase 2 of the program helps trainees develop specific professional skills useful inside and outside academia, such as time management, conflict management, communication skills, and professionalism. Phase 2 continues with career specific skills delivered in various courses and seminars. Phase 3 supports all trainees through their job search and transition to positions outside NYU.

NYU-STEP builds on successful programs developed at NYU and presents a formalization of career training and development of postdocs and graduate students as science professionals. NYU-STEP evaluates the knowledge level of participants about biomedical workforce careers starting in phase 1 and throughout the 3 phase program to better track career outcomes for all participants, including the traditionally hard to track postdoctoral employees. NYU-STEP is not intended to significantly alter the ultimate career outcomes of trainees, since so few are ending up in tenure track positions already. Instead, NYU-STEP encourages trainees to push their careers forward faster, and includes shorter time to PhD and less time spent in postdoctoral training as intended outcomes.

Unique to NYU-STEP is that all NYU trainees at the NYU Medical Center and Washington Square are eligible and encouraged to participate in the program. There is no mandatory entry point. Though we encourage participants to start at Phase 1 and take the IDP course offered each semester, we do not preclude those that have not from participating in activities in Phase 2 or Phase 3 of the program. NYU-STEP tracks participation at all phases and analyzes data to identify and build on the most effective programing offered.
Rutgers University’s iJOBS Program
Yarmush, M., Millonig, J., Alder, J., Engelhardt, S., Garrett, S.

Rutgers University's iJOBS Program, (interdisciplinary Job Opportunities for Biomedical Scientists), was established in September of 2015 with a BEST Award from the NIH Common Fund to educate, mentor and guide Rutgers University’s 660 biomedical sciences and engineering PhD students and 175 postdoctoral fellows to pursue non-academic, skill-appropriate, professional careers. The iJOBS Program is intended to provide resources and support to broaden trainee experiences and help them transition efficiently to a wide-range of research and research-related careers in non-academic venues.

The iJOBS program is a four-phased initiative supported by Rutgers organizations focused in the Biomedical and Life Sciences, and directed as a partnership between the Center for Innovative Ventures of Emerging Technologies and the Graduate Schools of Biomedical Sciences at Robert Wood Johnson Medical School and NJ Medical School. Spanning two campuses, New Brunswick and Newark NJ, the iJOBS program is specifically designed for current PhD students, Post-Doctorate fellows and Rutgers alumni and encourages trainees that have completed the program to re-engage and serve as mentors to the program’s budding professionals.

Our program follows the iJOBS trainees through their entire journey for professional placement. Phase 1, iNQUIRE, is the starting point for all trainees, lays the foundation for professional preparedness and provides insight into available career choices. Trainee entry experiences include instruction for business, management and communication skills essential to career success. Industrial partners continue trainee dialogue with hosting of site visits and participation in networking sessions. In Phase 2, iINITIATE, trainees formally commit to the iJOBS program and apply to take part in intensive training and coursework for their career track of choice. Industrial partners demonstrate the career’s practical side with hosting of shadowing and mentoring activities. Throughout, individual development plans document the journey and a mentor pod guides and advises trainee progress. Within Phase 3, iIMPLEMENT, trainees prepare for success with individualized guidance during professional search and placement. Resume and application packages are honed and interview skills perfected with iJOBS coaching. Focused career fairs showcase suitable career opportunities and provide industrial partners access to these professionally competent candidates, many of whom they have mentored. Upon successful career placement, iJOBS program alumni are encouraged to share their wisdom with new iJOBS trainees in Phase 4, iINSTRUCT as they serve as mentors, event hosts and shadow partners.
Although we stress the soundness of all career paths, there are five upon which our program initially focuses. Although Science & Health Policy, Intellectual Property Management, Industrial Development & Business Management, Clinical & Regulatory Testing Support and Health & Science Data Analysis form our initial cadre of career tracks, these tracks will be assessed on an ongoing basis and adjusted, as appropriate, to meet the needs of the professional market and the interests of the iJOBS trainee. iJOBS Program Ambassadors, academic experts in their areas, as well as professional partners focused in these fields, guide the framework that prepares our trainees to succeed in these non-academic careers. Our goal is to ensure that the iJOBS trainees cross the employer’s threshold with the knowledge and skill required to make an immediate impact to the organization.

Phase 1 of the iJOBS Program was launched in the spring of 2015. Over 125 trainees registered to participate in event programming that brought together academic experts, (representing over 27 departments, 23 programs and 8 schools across 2 campuses), with professional partners (ranging from large pharmaceuticals to boutique consulting firms) and regional biomedical and life sciences associations and programs, (such as BioNJ, HealthCare Institute of NJ, Talent Networks of NJ, etc.). Programming included participation in a SciPhD course provided by Human Workflows, LLC. to help trainees assess their current skill set and express it in business-friendly language as well as recognize skill gaps in areas such as communication, leadership, team building, negotiation and project management. Site visits to the Commercialization Center for Innovative Technologies (CCIT), the Department of Health and Merck offered a practical view of the business of innovation, government research opportunities and the variety of career options within pharma, respectively, and career panels brought professionals from Janssen, Bristol Myers Squibb, Biogen and others to share their insights with trainees. Our partners at the Rutgers Eagleton Institute of Politics co-hosted a workshop about communicating science to politicians; part 2 of the workshop will explore how science affects political decisions about education, health & the environment. Alignment with Rutgers’ Career Services offered the trainees programming in interviewing and networking and New Jersey’s life sciences trade organization BioNJ, is providing a session on career fair navigation and co-hosting our career fair scheduled for April, 2015.

The iJOBS Program is evaluated annually by an external advisory board representing the interests and perspectives of our industrial partners, (including Merck, The Huron Group, Bristol Myers Squibb, Stryker, Allergen and others), our faculty ambassadors, our students, postdocs and alumni, partnering trade associations (BioNJ, HINJ and others), neighboring BEST institutions (NYU), and interested “CIC Big Ten” institutions (Penn State). We have also welcomed non-BEST regional institutional partners (Columbia University), as well as other distinguished internal and external partners, to our annual symposium to learn about our program and to share “BEST” practices.

To learn more, visit ijobs.rutgers.edu
The University of California, Davis FUTURE Program

Meyers, F.M., Berglund, L., Hargadon, A.B. (PIs),
Greenier, J.L. (Program Director); Hayashi, S.A. (Program Manager)

The UC Davis FUTURE (Frontiers of University Training to Unlock the Research Enterprise) program was established to enhance the knowledge and skill sets of biomedical postdocs to better prepare them for a wide range of career options both within and beyond academia.

The FUTURE program provides general professional development skills, exposure to multiple career options, and experiential learning through internships and externships. Graduate students and postdocs can participate in FUTURE through one of two tracks. Those interested in a series of professional development workshops, an internship experience, and guidance from a career advisor are directed to the Certificate Track. Participants who complete the required components of this track receive a professional development certificate to document their FUTURE activities and experiences. Those who prefer a less structured, less-intensive professional development experience with occasional check-ins from a career coach can choose the Self-Directed Track, which allows more flexibility and less time commitment. All FUTURE participants have access to the Career Explorers Network and the Career Exploration Fund to support professional development and career exploration activities.

The FUTURE program has strong partnerships with the Internship and Career Center, Graduate Studies, the Biotechnology Program, and the Institute for Innovation and Entrepreneurship, which all sponsor high quality programming to help graduate students and postdocs develop professional skills and gain exposure to various career paths. Through these partnerships, FUTURE participants have access to a broad range of external partners in biotechnology, business development, science communication and policy, and regulatory science, and the opportunity to cultivate critical specialized skill sets needed to thrive in biomedical careers.

A special focus of our program is to support postdoctoral scholars and international scholars in finding internship and externship opportunities that will accommodate the time limitations and visa restrictions that these trainees often encounter.

An early success of our BEST award has been the launch of a career exploration website which links users to career exploration opportunities and to the sponsors (both UCD and external) that host and promote them. Gathering all opportunities for career exploration at UCD and the surrounding region in one place enables graduate students and postdocs to quickly and efficiently search and find opportunities by date, interest area, or format.

To learn more, please visit the UCD FUTURE program career exploration website: www.future.ucdavis.edu
Participating UCI Schools
Ayala School of Biological Sciences
School of Medicine
Henry Samueli School of Engineering
School of Physical Sciences
Program in Public Health

Leadership
David Fruman PhD, PI, Professor of Molecular Biology & Biochemistry
Emma Flores PhD, Program Coordinator
Karina Cramer PhD, Co-I, Associate Professor of Neurobiology & Behavior
Andrej Luptak PhD, Co-I, Associate Professor of Pharmaceutical Sciences, Chemistry, and Molecular Biology and Biochemistry
John Lowengrub PhD, Co-I, Chancellor's Professor of Mathematics, Biomedical Engineering, Chemical Engineering and Materials Science
Christopher Vanderwal PhD, Co-I, Associate Professor of Chemistry
Christine E. McLaren PhD, Co-I, Professor of Epidemiology
Fred Ehler PhD, Co-I, Professor of Pharmacology
Ulrike Luderer MD, PhD, Co-I, Associate Professor of Medicine, Developmental and Cell Biology and the Program in Public Health
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Oladele Ogunseitan PhD, MPH, Co-I, Professor of Public Health, Director of Research, Education, and Career Development for the Institute for Clinical and Translational Science

Goals
UCI’s Graduate Professional Success in the Biomedical Sciences (GPS-BIOMED) aims to better prepare graduate students and postdoctoral scholars for a variety of careers within the biomedical research workforce, and empower trainees to become not only skilled scientists, but also polished professionals.

Approach
To better prepare trainees for diverse careers GPS-BIOMED is providing innovative activities to meet the following goals:

EXPLORE: Increase awareness and interest in science-related careers outside of academic research. GPS-BIOMED is a campus-wide program spanning Schools, departments and PhD programs. The program is open to second year PhD students and postdoctoral fellows who have been at UCI for at least 6 months. Our broad approach to participation aims to foster an environment where all trainees in the biomedical sciences are supported during their career development. IDPs are required for all trainees to facilitate skill assessment, as are LinkedIn profiles to aid networking. Furthermore, career seminars such as Life Beyond the PhD (described below) are terrific ways for trainees to explore career paths.

Life Beyond the PhD – In collaboration with the Department of Chemistry, GPS-BIOMED hosts a series of career seminars featuring PhD graduates holding positions in science-related careers outside academic research. Speakers give a formal presentation and meet individually with graduate students, postdocs and faculty members.

TRAIN: Improve communication and other skills needed to pursue academic and non-
academic career paths. Traditional training programs in the biomedical sciences provide excellent scientific preparation for PhD students and postdoctoral fellows, however an evolving workforce demands these individuals be equipped with the skills necessary to succeed in diverse fields. Science Communication Skills and Extension courses (described below) are two examples of how GPS-BIOMED is broadening the scope of career training.

Science Communication Skills – Designed and taught by Sandra Tsing Loh, well-known author and creator of the podcast “The Loh Down on Science”, this course is centered on performing six-minute TED-style science talks given in layman’s language. In the last few session’s trainees are professionally videotaped and videos are posted on a GPS-BIOMED YouTube channel. This channel serves to publicize the exciting research conducted at UC Irvine as well as the goals of the BEST initiative.

Extension Courses – Trainees receive fee waivers for valuable courses through UCI Extension School of Continuing Education.

EXPERIENCE: Provide hands-on experience through internal and external internships. Gaining hands-on experience in the potential workplace will allow trainees to improve their qualifications and make informed decisions. Below are two examples of on-campus and off-campus opportunities developed specifically for GPS-BIOMED:

UCI Institute of Innovation – The NEW UCI Institute for Innovation is a campus-wide center integrating research, entrepreneurship and technology to create real-world applications that benefit the public and drive the economy. At the Institute, GPS-BIOMED interns have the opportunity to learn about the many components involved in budding startup companies.

Fish & Tsang LLP – Fish & Tsang LLP is a premier intellectual property (IP) law firm located in Irvine that represents small investors, startups and multi-billion-dollar Fortune 500 companies through all aspects of the IP process, including patents, trademarks, copyrights and trade secrets, as well as litigation and licensing. At Fish & Tsang, GPS-BIOMED interns will work with a team member and fellow interns in a fast paced collaborative environment.

TRANSITION: Build networks that allow trainees to prepare for and transition to science-related careers. Mentorship and networking are key elements for successful career transitions. GPS-BIOMED is creating the following activities to facilitate career transitions and equip trainees with networking skills:

Networking mixers – With help from external advisors such the Orange County Technology Accelerator Network (OCTANe), GPS-BIOMED is hosting networking mixers where visitors from a single job sector—i.e. biotech start-ups, patent law firms, nonprofit organizations, and regulatory affairs agencies—discuss opportunities and daily job functions.

Alumni mentoring program – GPS-BIOMED is currently enlisting professionals who did their graduate or postdoctoral work at UC Irvine to establish a cohort of UCI alumni willing to serve as mentors to trainees. Trainees will be paired with professionals in a specific career of interest for advice on preparing for jobs, tailoring resumes, interview tips, etc.

Incentives
To encourage participation, trainees receive “professional development” credits for completing activities. Faculty buy-in is achieved in part through emphasizing value to research efforts (improved scores on training grants and fellowships; new partnerships with industry).
Motivating INformed Decisions:  
Career Development for the Future of the Biomedical Workforce  
A UCSF Program funded by the NIH BEST Grant Program (5DP7OD018420-03)

Principle Investigators:  
Jennie Dorman  
Bill Lindstaedt  
Theresa O’Brien  
Keith Yamamoto

Key Personnel:  
Elizabeth Silva  
Alexandra Schnoes  
Christine Des Jarlais  
Christy Boscardin

Introduction:
As an institution that is devoted solely to graduate education in the health and biomedical sciences, UCSF is in a somewhat unique position, having an established career center that has been serving biomedical graduate students and postdocs for over 10 years. Thus, our proposal is centered on efforts to understand and facilitate the decision process itself, with concepts outlined in the book *Working Identity* by Herminia Ibarra.

- **Short-term goal:** To create, deliver, and test the effectiveness of a comprehensive career development intervention for early-stage graduate students and postdocs and their mentors, *intentionally targeting specific knowledge gaps and motivational gaps that impede the career decision-making process.*
- **Long-term goal:** To change the culture at UCSF, so that trainees can more openly and effectively pursue the career trajectories of their choice.

The Trainee Experience
The trainee experience is centered on an 8-month program, running September to May each academic year. Graduate students who passed their qualifying exams within the previous year, and postdocs who are less than two years into their training, are eligible to apply. The experience takes place in two phases:

- **Phase 1. Catalytic Coursework:** Over three full Saturdays in September and October, trainees develop the skills and tools needed to launch their career exploration. The course includes: self-assessment (myIDP and MBTI); overview of career exploration theory and the concept of “working identity”; overview of the tools needed to gather information about careers of interest, and to prepare for informational interviews and job shadows.
- **Phase 2. Career Exploration in Peer Teams:** From November through May, UCSF trainees use the skills and information from the catalytic course to explore different career paths through informational interviews and guided shadowing experiences. These experiences are hosted by UCSF partners, who are PhD level-professionals in the biomedical workforce. Trainees share what they learn about career paths with members of their peer team (6 per team, plus 2 facilitators), and in MINDbank (below). Trainees help each other maintain motivation as they work through repeated iterations of a propose-and-
test model of exploration. At the conclusion of the Peer Team phase, trainees will have concrete plans for undertaking deeper exploration and/or transitional experiences for careers of interest (e.g., internships, courses, projects, additional training).

**MINDbank**
MINDBANK is a crowd-sourced curated databank of career information. Early in the program, it will be used primarily by UCSF trainees, to identify appropriate partners. Eventually, the information provided by the partners themselves, as well as the trainees following their career exposure experiences, will be aggregated for the public interface, at which point trainees nationwide will be able to mine MINDbank for information in a wide range of career paths and jobs. Aggregate information for each of the specific career paths will include the skills and tasks required, transitional experiences, job trends and demographic info, and other advice or information that will help biomedical trainees identify, and navigate a transition into, a new career path.

**The Faculty Experience**
Faculty already face grueling demands on their time, intellects, and energies; they have limited bandwidth for additional responsibilities, no matter how important they may be. Over the course of three years, we will design, implement and evaluate an intervention in collaboration with the faculty and senior campus leaders, so that faculty are active participants in changing UCSF culture, and in a way that meets their concerns and needs.

- **Needs Assessment with Faculty:** We will conduct focus groups and one-on-one interviews to identify the needs, concerns and interests of faculty, in their roles as researchers and as mentors of trainees who are considering their career options. This information will serve as a needs assessment and will inform the development of a baseline survey for faculty.

- **Implementing resources and rewards:** Using the information from the needs assessment, we will work with senior campus leadership and faculty to design and implement interventions that provide the resources and rewards faculty need to mentor their trainees’ career development.
The University of Chicago’s BEST award supports the myCHOICE (Chicago Options In Career Empowerment) program, which launched in October 2014.

Program Directors (PIs):
Erin Adams, PhD (Associate Professor, Biochemistry and Molecular Biology) contact PI
Victoria Prince, PhD (Professor, Organismal Biology & Anatomy; Dean for Graduate Affairs)
Julian Solway, MD (Walter L. Palmer Distinguished Service Professor; Director, Institute for Translational Medicine; Dean for Translational Medicine)
Alan Thomas, MBA (Associate Vice President; Director, University Center for Technology Development and Ventures)

Program Staff:
Ellen Cohen, MPP, Executive Director (Executive Director, Center for Health and the Social Sciences
Abby Stayart, PhD, myCHOICE Program Manager
Michael Tessel, PhD, Program Navigator (Assistant Director, Graduate Career Development)

myCHOICE benefits from a broad based steering committee that includes representatives from the UChicago Biological Sciences Division (BSD) postdoctoral association, graduate student dean’s council, and diversity committee, and from the UChicago biotech association, Center for teaching, Graduate Student Affairs office and Provost’s office.

The myCHOICE program is open to all graduate students and postdoctoral trainees pursuing biological sciences training at UChicago. Programming emphasizes both career exposure and professional development; career exposure covers ten general areas based on the myIDP (Individual Development Plan from Science Careers) categories. These are shown below in the Figure under E1, colored according to the visual spectrum. Exposure areas include such broad topics as Industry, Tech Commercialization, Entrepreneurship, Medicine/Healthcare, Business of Science, Law, Science Communication, Teaching, and Administration, and also provides exposure to Academic Research. myCHOICE is characterized by a three phase training plan based around Exposure, Education and Experience
(E1-E3) of the above topics. The E1: Exposure seminar series “What can I do with my PhD” is open to all participants including those from other institutions. E2 and E3 level programming requires a myCHOICE application, including completion of the myIDP.

Among the unique features of the myCHOICE program are the inclusion of guided mentorship from alumni and friends of the institution and “outstanding leveraging of internal and external resources and the experimental nature of the plan with hypothesis testing” (quoted directly from the Resume and Summary of Discussion from peer review).

Internal resources include the Booth School of Business, the Harris School of Public Policy, UChicagoTech, and the Chicago Innovation Exchange (the location of some myCHOICE events). External resources include MATTER (a Chicago based healthcare innovation center), the Alan Alda Center for Communicating Science and several local industry partners.

The myCHOICE innovative evaluation plan is designed to test two hypotheses.

Hypothesis 1 - More extensive participation in myCHOICE predicts greater trainee career choice empowerment and satisfaction with chosen career.

Hypothesis 2 - More extensive participation in myCHOICE predicts improved concordance between myIDP Career Fit assessment at training exit and actual career selection.

A survey of UChicago BSD graduate students after just one quarter (3 months) of myCHOICE programming has indicated that 90% of trainees are aware of the program and 70% have already attended at least one event.
BEST PROGRAM - CU Denver|Anschutz Medical Campus

Principle Investigator: Inge Wefes, PhD

The Graduate School at the University of Denver|Anschutz Medical Campus serves, among other students, about 280 PhD students and about 240 postdoctoral fellows in the basic biomedical sciences, and the basic biomedical science programs are all housed on CU's Anschutz Medical Campus. In 2013, due to the generous support of the NIH, we started the BEST Program with the aim of enhancing the competitiveness of our trainees for research or science related jobs inside and outside academia. We designed our BEST Program in a four-part model: PECE, standing for Preparation, Education, Cultivation and Employment.

I) PREPARATION: While postdocs are very welcome to join the preparation, it is primarily designed to serve incoming PhD students in getting settled on campus and building early on a community of mutual support, regardless of the program in which they are enrolled. Since 2014, we require all incoming students to participate in a two-day GPS Orientation where they learn in small groups, in rotating sessions, Graduate and Professional Skills such as professional record keeping, critical and analytical thinking, the identification, evaluation and use of onsite and online library resources, time management, as well as the set-up of an Individual Development Plan (IDP). All individual workshops of the GPS Orientation are started with a pre-assessment of the students' confidence regarding their prior knowledge with respect to the information that will be delivered in the specific session, and at the end of each session, all participants have to fill in a post-event assessment to test if their confidence in the presented knowledge area has improved and if the workshop was of value to them. Our first GPS workshop in 2014 was very successful, and with the students' feedback, we will adjust the 2015 GPS orientation to serve the newcomers even better. At the end of the two-day GPS orientation, all students are paired up with an advanced student from the program that they just joined, and the older students serve as peer mentors for the first year of study and will hopefully become friends for life. At the end of the academic year, the students receive reminders to update their IDPs and discuss them with their PIs. For students and postdocs who are already on campus for longer, we offer a workshop on the value of the IDP. In the information session for incoming postdocs, all are strongly encouraged to start an IDP if they have not yet set one up.

II) EDUCATION: Our BEST Program faculty has developed and offered multiple new workshops that are open to all new and advanced students and postdocs in the biomedical sciences. Due to the time constraints of our trainees, we are offering workshops during the semester at different times during the day, i.e. some starting at 7 AM, some ending at 8 PM and most meet 5 times for 2.5 hours. For sustainability perspectives, we anticipate that this format can most easily be converted into 1-credit courses, once we have fully assessed which workshops are most valuable to our trainees. Workshop topics include (see also summary overview picture at the end): Advanced Critical and Analytical Thinking, Scientific and Technical Writing, Life Science Development and Commercialization and a two-day boot camp, contracted with SciPhD on Science in Industry. While very work intensive, and starting on a Sunday, the Fall boot camp on Science in Industry had an especially strong impact on the attendees and inspired them to set up the first Rocky Mountain Biotechnology Symposium (RMBTS) for mid May 2015. RMBTS is an exclusively student and postdoc designed and developed initiative, where they invite local biotech companies to the Anschutz Campus, listen to their pitches, visit
their booths, hope to enhance the interactions between industry and academia and develop valuable networks for future employment. In extension of what they learned in the boot camp and in preparation for the anticipated engagements at the RMBTS, they are also setting up mock interview sessions that should also be helpful to those who could not attend the boot camp.

III) CULTIVATION: In order to be successful with our initiatives related to the remodeling of bioscience graduate student and postdoctoral training, we make all efforts to secure the support and the buy-in of our biomedical faculty. In Spring 2014, we initiated a Council of Graduate Educators, where we invite once a semester all Graduate Faculty in the biomedical sciences to a town hall meeting to inform them about new initiatives of the BEST Program and their outcomes, and invite their comments and suggestions on how we can prepare their trainees also for careers outside academia without too much interference with their research training. Preceding those meetings, we set up a faculty survey that also invited statements of concern as well as expressions of interests in, for example, faculty development opportunities that might not only be of value related to the faculty’s research, but also help them to become stronger advisors on issues beyond science. Unfortunately, a faculty workshop on Life Science Development & Commercialization that we tried to offer based on our survey results, had eventually to be cancelled because too many faculty members ran into time conflicts. We will try that again.

In the spirit of supporting a culture of support, respect and recognition, in 2014 we also initiated the annual Milestones of Success Celebration. In this 90-minute event, we celebrate reasons for all trainees and faculty to shine and stand up at least once, for example, people who have a publication in this year or a grant or fellowship, trainees who passed the qualifier, graduated or found a job etc. At that occasion, we also recognize outstanding peer mentors and faculty sponsors.

IV) EMPLOYMENT: While our BEST Program is still too young to have results on the enhanced employability and employment of our trainees, we are grateful for having a Bioscience Advisory Board with members mostly from outside academia that inform and advise us regarding desirable skills beyond research that would make our trainees competitive for careers also outside academia. We are also offering (for the second time this Spring), a very well received workshop on Team Building & Leadership Development that encourages and teaches participants to identify their personal style of team and leadership engagement, what adjustments might be desirable and can be learned, and for what kind of employment individual styles might be well suited.

For all offered workshops, trainees who attend at least four out of five workshops sessions will earn a Certificate of Participation. Trainees who attend at least four of the professional development events that are offered by the BEST Program will earn Recognition of Professional Development.
The BEST program at University of Massachusetts Medical School: 
An integrated curriculum and community-based approach to career development

Our training environment: The University of Massachusetts Medical School (UMMS) is a freestanding campus of the UMass system and the sole publicly funded medical school in the state. The first PhD students were admitted in 1979, and in the past three decades the Graduate School of Biomedical Sciences (GSBS) has grown to more than 350 research faculty, 350 doctoral students, and 325 postdoctoral scholars. Basic biomedical science students are admitted into an umbrella Ph.D. program and then become affiliated with a discipline-specific graduate program upon joining their thesis lab. The central curriculum includes an emphasis on writing and presentation skills through “Communicating Science,” a course required for first-year students. Prior to the BEST award, UMMS had only recently begun offering centralized support for career development across career paths, including monthly seminars through the Office for Postdoctoral Scholars (since 2009) and individual appointments and workshops via an Assistant Dean position focused on career and professional development (2012). As such, UMMS acts as a test case for institutions seeking to develop new career-related programs in a context without the resources available through an on-site undergraduate campus (e.g., career services, writing center, business school). Our efforts have been bolstered by support from a Burroughs Wellcome Fund Career Guidance grant (2013-14) and an NIH BEST award (2013-2018), resulting in the creation of the GSBS Center for Biomedical Career Development (2014).

Our goal: We aim to empower all Ph.D. and postdoctoral trainees to take informed action early in their training, building the skills and experience needed to succeed in their scientific training and in their future careers. We aim to reach this goal by means that will enhance research productivity, while not lengthening time to degree.

Our approach (next page) is informed by Lent, Brown, and Hackett’s Social Cognitive Career Theory (SCCT), a well-established model focused on factors (including self-efficacy, goals and likely outcomes, and contextual support) that influence career interests and decision-making.

Defining characteristics of our approach and related hypotheses:

• **Reach all trainees** by requiring professional development as a critical component of doctoral and postdoctoral training. *We hypothesize that incorporating professional development into the standard training experience will empower trainees to take action earlier and more efficiently move into their desired career.*

• Teach professional skills in the context of what trainees need to succeed at each stage of their training. *We hypothesize that a time efficient just-in-time strategy will increase trainee and faculty receptivity, and further maximize learning outcomes by supporting opportunities to practice skills in the context of their thesis research.*

• Encourage openness to and informed investigation of multiple career options. *We hypothesize that this will enhance self-efficacy and encourage identity formation in a way that will enable trainees to adapt in future career transitions.*

• Treat all career outcomes equally. *We aim to model appreciation for all career options, with a focus on allowing trainees to determine their own best fit.*
Test our approaches and hypotheses with rigorous evaluation and research methodologies.

All Ph.D. students will be required to:
- Participate in a professional development co-curriculum (short, periodic workshops or mini-series) integrated into the standard training experience in the first few years of graduate school.
  Objectives: Strengthen professional skills needed for success in both thesis research and future careers (including interpersonal communication and leadership, presentation, writing, career planning, and communicating with mentors)
- Discuss career planning and preparation beginning in Year 1 and culminating in a mini-course in Year 3 in which students create their first Individual Development Plan (IDP)
- Create and submit an annual Individual Development Plan (IDP), beginning in Year 3.
  Objectives: Empower students to annually create a plan that includes goals for their research, skills development, and career advancement. Students are encouraged to seek mentorship and discuss the IDP, in whole or in part, with multiple mentors.
- Complement students’ annual feedback from their advisor and thesis advisory committee
- Join two learning communities themed around career pathways of students’ interests, each led by trained student co-leaders and a Ph.D. scientist actively employed in the career path.
  Objectives: Encourage deeper exposure to and mentoring for multiple career paths within students’ field of interest.
- Provide contextual support by connecting students to peers who share common career interests, and mentoring by a Ph.D. scientist actively employed in the field who has successfully navigated career transitions
- Facilitate identity formation with more than one career path, supporting future adaptability
- Enhance institutional connections with alumni and external partners

All postdoctoral scholars are required to attend a two-hour “Career Planning via an IDP” lesson as an addition to the already-required Responsible Conduct of Research course.

All trainees will have access to additional opportunities to enhance their own training based on priorities they set in their IDP, including:
- Advanced professional skills and career-specific training
- Partnerships offering site visits, shadowing, and full- and part-time internships
- Professional development scholarships for unique opportunities off-campus
- Online resources, including a new website to complement our curricula, career.umassmed.edu

Contact:
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Morgan Thompson, Ph.D.
Assistant Director, Career Development, Graduate School of Biomedical Sciences

In collaboration with our BEST Steering Committee: Anthony Carruthers, Ph.D. (Dean, Graduate School of Biomedical Sciences); Mary Ellen Lane, Ph.D. (Associate Dean, GSBS Curriculum and Academic Affairs); Anthony Imbalzano, Ph.D. (Associate Dean, Office for Postdoctoral Scholars and Graduate Program Director of Cell Biology); David Weaver, Ph.D. (Graduate Program Director of Neuroscience).
The ImPACT Program at the University of North Carolina – Chapel Hill

Co-PIs: Patrick Brandt, Patrick Brennwald, and Jean Cook
The Immersion Program to Advance Career Training (ImPACT) aims to change the culture of life science training at UNC. Success will be measured by decreased time to degree, decreased time to first permanent job, increased career satisfaction, and increased placement of our trainees in a wide range of research and research-related careers.

ImPACT builds on UNC’s long-standing commitment to professional and career development for our 1000 biological and biomedical graduate student and postdoctoral trainees. ImPACT is made possible by an NIH BEST grant awarded in 2014 and by UNC’s ongoing financial commitment to biomedical research training. The program is an expansion of our Training Initiatives in Biological and Biomedical Sciences (TIBBS) program, which began in 2006.

ImPACT is composed of four main components as outlined in the graphic below. All aspects of the program are freely available to life science graduate students and postdoctoral trainees except for the internships, which are competitive. Details of each program component are explained below the graphic.

Core Competencies. In partnership with the UNC graduate school and individual programs, life science trainees receive instruction in grant and manuscript writing, mentoring and teaching skills, leadership and job hunting skills, and in short all the non-bench skills needed to be successful scientists in a wide range of careers.

Career Cohorts. ImPACT provides structure and support for trainee-led career cohorts that meet monthly to network with invited professionals, share career resources, and report back on informational interviews. Career cohorts that have already started include Science and Business Club, Science Policy and Advocacy Group, Program in Industry Exploration, Science Writing and Communication Group, and Teaching Intensive Careers Group. The Career Cohort model allows for grass-roots creation of trainee groups to meet any need. Groups receive a small budget from ImPACT that is supplemented by university funds. Trainees gain leadership experience through their groups and groups frequently collaborate to bring in scientists whose job duties span interest areas.
NiH Best Awards

Career Education. Supplementing the career exposure available through the career cohorts, ImPACT also plans events and workshop series targeted to trainees at specific career stages. For example all first year graduate students receive instruction in creating an Individual Development plan before they have even chosen a dissertation lab. ImPACT sponsors the Annual Career Blitz, which brings 2 dozen scientists from a wide variety of research and research-related careers in and out of academia, to campus for an afternoon of instruction and networking. Last year’s career blitz was attended by nearly 200 trainees. Five-part workshop series take place at yearly intervals on topics including Industry Skills, Pedagogy/Active Learning Skills, and Science Policy Careers. Nationally known consultants and speakers anchor the workshop series that are supplemented by expert local knowledge.

Immersive Learning. UNC’s proximity to the Research Triangle Park situates us to take advantage of multiple immersive learning opportunities. Trainees go on monthly field trips to local companies, organizations, and non-profits representing nearly all available career options. The capstone experience available to graduate students and postdoctoral trainees on a competitive basis are 160-hour internships that can take place during 1 month of full time effort, or part time over 2-3 months. Thirty internships are available per year and interns are paid at their current stipend of salary rate. Currently the internships are almost paid for by UNC, but we hope to garner industry support in future years that will sustain the program in the long term. Graduate students must have passed their qualifying exams and all trainees must have written support of their faculty mentor in order to apply. ImPACT directors have developed relationships with about 15 internship providers, but trainees chosen for internship funding can also create their internship opportunities.

As trainees at all levels engage with ImPACT we expect to see a change in the training culture at UNC that will benefit trainees and faculty alike. We will evaluate our initiatives vigorously in order to accentuate the effective components of ImPACT and proactively improve components that are found lacking.
Key Personnel: Stephen Dewhurst (PI), Sarah Peyré (Co-PI), Tracey Baas (Executive BEST Director)

UR’s Broadening Experiences in Scientific Training (URBEST) Program seeks to better prepare graduate students and postdoctoral trainees for careers outside of academia. To do this, it funds instruction in leadership and professionalism, creates new opportunities for experiential learning through internships and shadowing, and provides training pathways in (1) industry, manufacturing and entrepreneurship; (2) regulatory affairs, compliance and review; and (3) science and technology policy.

First URBEST program activities include an Individual Development Plan (IDP) Workshop, a Leadership Advantage Program, and a URBEST Retreat and Career Workshop. Internship opportunities are available to select URBEST trainees who show research productivity and career development initiative.

Novel components of the URBEST program include:

1. Incorporating Self-Determination Theory (SDT) into trainee IDPs and program evaluations to ensure continuous improvement and effectiveness of URBEST activities. Dr. Richard Ryan, co-developer of SDT, will help to assess the impact of autonomy, competence and relatedness on outcomes, perceptions and attitudes of URBEST trainees.

2. Reframing the IDP using the three URBEST pathway offerings and URBEST mentors to push trainees to think outside academia and to avoid IDP fatigue.

3. Establishing three types of mentor networks – faculty, alumni and peer – to foster improved mentoring practices and better support trainee autonomy and diverse career outcomes. This has been initiated with a URBEST LinkedIn Group and SDT-based Mentoring Workshops.

4. Flipping the classroom for a Career Stories Q&A Seminar series. Using this method, students prepare for the seminar by reading a blog post and CV of the seminar speaker, who works outside the typical academic career. If the trainee wants to attend the Q&A, they send in a question they would like to ask the speaker as an RSVP. The session starts with the speaker presenting 5 – 7 slides in 10 minutes, while the rest of the 50 minutes is spent on Q&A.

5. Marketing UR’s Center for Professional Development (CPD)-sponsored Virtual Speed Alumni-Trainee Networking through Brazen Careerist.
6. Developing courses tailored for URBEST trainees, such as UR Ventures-led Intellectual Property and Commercializing Technology and CPD/URBEST-facilitated Business and Leadership Skills for Scientists.

To learn more visit urbest.urmc.edu or contact tracey_baas@urmc.rochester.edu
The Vanderbilt ASPIRE Program (Augmenting Scholar Preparation and Integration with Research-Related Endeavors) was established in 2013 with a BEST Award from the NIH Common Fund to empower and prepare Vanderbilt’s ≈ 500 biomedical sciences PhD students and ≈ 500 postdoctoral scholars to make well-informed career decisions. ASPIRE is intended to provide resources and support to broaden their experiences and help them transition efficiently to a wide-range of research and research-related careers in both academic and nonacademic venues.

ASPIRE is a three-phase initiative administered through the Office of Career Development within the Office of Biomedical Research Education and Training (BRET) at Vanderbilt University School of Medicine. The IMPACT phase is specifically designed for first-year PhD students in the basic biomedical sciences and provides early trainees a solid foundation on which to begin to build their scientific careers. Led by Vanderbilt faculty, IMPACT establishes a strong mentoring environment and exposes students to various topics on professionalism in the sciences. Specifically, we inform first year students of the wide range of careers options developed by their predecessors in our training programs. We stress the validity of all career paths as well as informing how we will help them test and develop their interests. We emphasize that with the training at this institution, all career paths are equally valid and respected. The EXPLORE phase targets PhD students in years 2-3 of training, as well as postdoctoral fellows. This phase focuses on jumpstarting career management through self-assessment, networking and planning. Participants in this phase have the opportunity to shadow a professional at their job for 1-3 days through the ASPIRE externship program. The ENHANCE phase is intended for post-qualifying PhD students and postdoctoral fellows. This phase represents the capstone phase of ASPIRE and includes access to didactic modules, as well as the opportunity to gain hands-on-experience through participation in externships and internships.

The ASPIRE Modules, which are part of the EXPLORE phase, were launched in the fall of 2014. Over 135 trainees registered to participate in five unique, non-credit bearing elective courses that were offered in three theme areas: business and entrepreneurship, communication and clinical research. Biomedical Research and the Media, directed by Wayne Wood, MLAS, Executive Director of New Media Production at Vanderbilt University Medical Center News and Public Affairs was limited to six trainees and provided exposure to science communication to the lay public via print journalism, media relations, social media, and media training. All participants had the opportunity to write and receive critical feedback on three print pieces, many of which have subsequently been published in the Vanderbilt Reporter, the university’s medical center publication with a circulation of 8000.
Also this past fall, the ASPIRE Program partnered with the Vanderbilt Office of Federal Relations to provide an externship opportunity to trainees in Federal Stem Policy and Advocacy. Nine participants from the ASPIRE program attended this two-day immersion workshop held October 16-17, 2014 in Washington, D.C., which gave trainees the opportunity to learn how federal STEM policy is made and the role that advocacy can play in influencing federal processes. Trainees had the opportunity to meet with a variety of officials, including a number of Vanderbilt University alumni, who work in the executive and legislative branches of the government, as well as multiple scientific societies and associations.

Vanderbilt’s second annual ASPIRE to Connect took place on March 3, 2015. This is a half-day workshop offered each spring in which graduate students and postdoctoral fellows gain practical tips and learn techniques for meeting new people and cultivating authentic connections. The event opened with Ashley Brady, Ph.D., ASPIRE Program Manager, speaking about “Everyday Networking” and the role networking has played in her career path. The afternoon was comprised of a variety of break-out sessions designed to help trainees expand their skills and confidence in growing their professional connections, including engaging in small talk, leveraging LinkedIn, media training to keep messaging on point, navigating interview situations, identifying and exploring personal networks, and making the most of professional conferences. This year’s event wrapped up with a wine and cheese networking reception immediately following the keynote talk, “Next Level Networking”, delivered by Lauren Celano, co-founder and CEO of Propel Careers, a life science search and career development firm based in Boston.

The ASPIRE Program is evaluated annually by an external advisory board comprised of sixteen members including a graduate student and postdoctoral fellow from Vanderbilt, several Vanderbilt faculty, as well as numerous distinguished external partners from academia, government, industry and the non-profit sectors.

To learn more, please visit the Vanderbilt ASPIRE Program website: www.medschool.vanderbilt.edu/aspire/
Virginia Tech’s Broadening Experiences in Scientific Training (BEST) Program was initiated in 2013 through a BEST Award from the National Institutes of Health, in order to help provide pre- and postdoctoral trainees at Virginia Tech with the information, experiences, and mentorship needed to prepare them for pursuing a broad range of academic and non-academic career paths, without extending overall training time. VT-BEST is administered through the Virginia Tech Carilion Research Institute, and operates in collaboration with the Graduate School, Postdoctoral Office, and external partners to deliver activities to trainees in the biomedical and health sciences across Virginia Tech. The program is further supported by an Advisory Board, which contains representatives from both institutional leadership and the bioscience industry. To date more than 90 students and postdocs have participated in BEST program activities at VT’s medical campus in Roanoke, VA and its main campus in Blacksburg, VA.

VT-BEST activities are open to participation by pre- and postdoctoral trainees at any stage of their training or career search, with some activities required by one or more graduate programs. In the inaugural year of VT-BEST, feedback was obtained through two open faculty forums, faculty and student surveys, regional bioscience industry events (including those offered by the Roanoke Blacksburg Technology Council and Virginia Bio), and Individual Development Planning (IDP) workshops, in order to optimize VT-BEST activities to meet the needs and interests of trainees and faculty at VT, and comport with opportunities in the region. This feedback highlighted the need for activities that would not significantly impact time spent performing research, but would educate trainees on a broad range of opportunities, allow flexibility for participation, introduce them to critical skills, and direct them toward opportunities for further development based on individual needs and interests.

The program offers three primary activities, the first being a 2-credit Professional Development (PD) course, recommended as a starting point for BEST participants. The PD course focuses on individual self-assessment, setting and obtaining short-term career development goals, identifying mentors, and developing an understanding and appreciation for the functions served by various biomedical professionals and how they interface with academic researchers. This includes instruction on skills topics such as grant and CV writing, incorporating improvisation training to improve science communication, as well as inviting speakers from Intellectual Property, Tech Transfer, Biotech Start-ups, Regulatory, Academia, and beyond to provide both formal instruction and career advice. For students who are beginning to fine tune their career interests, the VT-BEST Mini-internships are short (0.5 - 2 days) experiences that allow trainees to experience a “day-on the job” through hands-on activities and case studies offered by bioscience professionals at their place of business or at VT (for example, the Melanoma
Research Alliance, National Public Radio, and Nature Publishing Group). A limited number of travel awards are also provided for applicants attending externship/internship or professional development events outside the region. While these activities also aim to connect trainees to potential mentors, a formal mentorship program is also in development. The IDP is the cornerstone of all of these activities, and half-day IDP workshops are also offered at both campuses for trainees unable to take the 2-credit course.

The VT-BEST program activities, VT-BEST event calendar and website, and the BEST Newsletter also direct trainees to other excellent resources at VT that will complement their VT-BEST experiences and help them achieve their IDP goals, such as full semester graduate courses on important skills topics, leadership workshops, certificate programs for specialization in areas such as business or pedagogy, local/national conferences, networking opportunities, and career services resources.

Website: www.info.vtc.vt.edu
Wayne State University’s Broadening Experiences in Scientific Training [BEST] Program

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Steering Committee: Dr. Joe Dunbar, Dr. Andrew Feig, Dr. Christine Chow, Prof. Judith Moldenhauer, Dr. Mathew Ouellett, Dr. Janice Green, Dr. Elizabeth Dungee-Anderson

Wayne State University, a research-intensive postsecondary institution located in Detroit, produces an average of 150 PhDs annually, approximately half of whom are in 17 biomedical programs across the institution. In 2013, Wayne State received a BEST grant from the NIH to assist doctoral trainees in exploring a variety of career options outside of academia, to actively support those trainees who intend to pursue such careers, and to foment culture change among faculty so that such careers are viewed as positive outcomes, not “alternative” nor “second best.” One of the novelties of WSU’s BEST program is that doctoral students outside the biomedical disciplines are also encouraged to participate, adding richness to the diversity of our training experiences.

Our BEST program has 3 successive phases: Phase I – Exploratory seminars; Phase II – Didactic workshops; Phase III – Experiential internships. Phase I acquaints students with multiple career options from the first day of their entry into a PhD program via a set of 2-hour seminars, each exploring one of six career tracks with industry partners, faculty, and alumni whose work intersects with the biosciences and the following areas: undergraduate teaching, law, communication, business/industry, community engagement, and government. These seminars are videotaped and made available on the program’s Blackboard site so students can view them at any time. Phase II comprises a series of daylong workshops on the career options identified in Phase I. This is probably the BEST program’s most novel strategy: these workshops act as a crucial “bridge” between the exploratory seminars in Phase I and the internship experiences in Phase III. A team comprising community and industry leaders (many of whom are WSU doctoral alumni) work with faculty facilitators to design a curriculum focusing on those necessary skills sets for each of the six career tracks. Attendees gain more detailed knowledge through one-on-one exchanges with professionals in these domains. In particular, students learn how their scientific training, problem-solving abilities, and analytical aptitude can be mobilized to successfully address the needs of a career outside of academic university research. Attendees acquire important insights about how they can make a valuable contribution to a chosen field and have a successful lifelong career. Phase III offers students experiential learning about these career paths through completing internships with state agencies, nonprofit organizations, or private industry. Wayne State expects to integrate internships into doctoral training programs for the long term, which will facilitate students’ exploration of multiple career pathways via experiential learning.

As a starting point for effective career planning, doctoral students are offered sessions on constructing an Individualized Development Plan (IDP), which is now required of all doctoral trainees who are supported by federal funding. In the summer of 2014, the Graduate School established an Office of Graduate Career Services (OGCS), with a full-time director, as the focal point of career and professional development in both academic and nonacademic domains. The OGCS revamped the Graduate Professional Development series to include seminars on
basic employment skills as conducting a job search, preparing for an interview, and converting a CV to a resume. WSU faculty and staff also offer specialized workshops on abstract writing, poster presentation, professional communication in the workplace, and strategies for presenting scientific ideas to nonspecialist audiences.

With regard to encouraging cultural change in biomedical research training at Wayne State, BEST has adopted a number of approaches, most notably (1) sustained outreach by the Dean of the Graduate School to publicize the changing conditions of biomedical doctoral employment to key groups of campus stakeholders; (2) promotion of intentional mentoring among faculty via seminars conducted by the Office for Teaching and Learning; and (3) enhancement of doctoral program alumni tracking, which will help improve program outcomes as well as provide an invaluable network for ongoing career development among current students.

For more information about the BEST Program at Wayne, please visit our website: www.gradschool.wayne.edu/best/