



STANFORD UNIVERSITY SCHOOL OF MEDICINE

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Olivia M. Martinez, PhD
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Dear Olivia,

I am pleased to convey the enthusiastic support of the Stanford University School of Medicine for this renewal application for years 36-40 of NIH training grant T32 AI007290, Molecular and Cellular Immunobiology. This long-standing training grant has provided key support for the development and growth of one of the top immunology research and training programs in the country. With the overall excellence of the biomedical sciences at Stanford, the outstanding program faculty (including 23 new faculty added to the program during the previous grant period), the tradition of interaction and collaboration among the faculty and their lab groups, and the innovative research being carried out in immunology labs, prospects are strong for the continued success of this training program. I am committed to helping continue this program's history of innovation and success in graduate training and research.

The importance of immunology as a field of biomedical research continues to grow dramatically, as the immune system is implicated in an ever-widening array of conditions and diseases. The training of the brightest and most capable young scientists in immunology is critical for making progress in translating basic research findings into new approaches for improving human health. The program enabled by this training grant has supported both predoctoral and postdoctoral training in immunology at one of the top centers for immunology research. As is the case at most universities, immunology at Stanford crosses disciplinary boundaries; the 91 faculty members included in this training program have their appointments in 19 departments and divisions. Hence, training in immunology is interdepartmental, and this training grant provides critical support for a core of trainees, as well as for the staff and activities that support their training. Although PhD and postdoctoral training programs across the biomedical sciences here are supported by other training grants, this is the only training grant that is focused on immunology. This grant covers the breadth of basic, translational and clinical immunology, and is available to all of the immunology faculty in both basic and clinical departments.

As the progress report indicates, our immunology trainees have been very productive, contributing to pioneering research across basic, translational, and clinical immunology. Most of the program's alumni continue to be active in the biomedical sciences in academia and industry.

The training environment is enhanced by the dual traditions of collaboration across the Stanford Immunology community and of the development of innovative new technologies in immunology and the other biosciences. Immunology training here has been enhanced by the recent growth of two new research emphases. The first emphasis is the increased attention to human immunology--understanding what characterizes the healthy immune system and how it changes with infection, cancer, transplantation, autoimmunity, age, vaccination, etc. This reflects the development under Mark Davis, Director of the Institute for Immunology, Transplantation, and Infection (ITI), one of the Stanford Institutes of Medicine. In its Human Immune Monitoring Center (HIMC), ITI has developed extensive state-of-the art resources for multi-parameter characterization and data analysis of large numbers of samples. The second new emphasis has been on computational and systems immunology, critically important to the analysis of large data sets that arise through a growing number of research tools, including: multi-parameter cell phenotyping via CyTOF, other high-dimensional, high-throughput approaches to characterize circulating protein and lipid mediators and extracellular vesicles in human blood samples, single cell sequencing of antibodies and TCR and mining current gene expression data sets. With the importance of these quantitative approaches, the growth in faculty with expertise in these approaches, and the expanding interest of students, the PhD Program in Immunology added a new track for its predoctoral trainees, in Computational and Systems Immunology, complementing the pre-existing program, now called Molecular, Cellular, and Translational Immunology. This predoctoral training focus is unique among graduate programs in immunology.

Below we highlight the twelve areas of extensive institutional support that we offer for training grants and their trainees in the School of Medicine (SoM).

1. Developing and promoting a culture that advances the highest standards of scientific rigor, reproducibility and responsible conduct of research

Rigor and Reproducibility (R&R)

Our goals are to enhance graduate training in experimental design and data collection, organization, and analysis and to integrate computational competence-building activities into the graduate curriculum. In 2017, the Cellular and Molecular Biology T32 secured a NIGMS supplemental grant – Open Source Training in Computational Competence and Hands-on Data Analysis – to enhance training in data analysis and computational competence. This grant leveraged a key partnership with The Carpentries, an organization that builds global capacity in essential data and computational skills for conducting efficient, open, and reproducible research. This collaboration paved the way for Stanford Libraries (through initial training by The Carpentries) to offer six to eight Software Carpentry workshops per year, training up to 40 graduate students at a time to learn foundational coding and data science skills to solve their computational challenges. With this support, the University now has 62 internally trained instructors (graduate students, postdocs, and staff) to deliver such workshops to trainees on an ongoing basis.

The “Foundations in Experimental Biology” course for first-year graduate students is designed to facilitate students’ critical first steps toward becoming independent scientists. R&R training has been incorporated throughout this 7-week course with focus on experimental design elements, data analysis and practice, and how uncertainty can impact data considerations. Students work in small teams and with faculty to develop an original research project for oral presentation. This fall, the course will include a lecture led by David Glass from Novartis Institutes for Biomedical Research based on his book, *Experimental Design for Biologists*. His lecture will cover (1) how to frame a project; (2) system validation; (3) experimental controls and determination of N; and (4) data gathering, interpretation, and model building. In addition, there are 38 computational, quantitative, and/or statistics courses that support skill development in quantitative/computational areas including experimental design, data analysis, data validation, and data curation.

Our popular Stanford Biosciences Grant Writing Academy supports over 100 graduate students (2nd years and beyond) and postdocs annually in creating proposals and productive writing practice as preparation for F and K fellowship applications. As R&R is a significant component of these applications, we will expand our scope to include individual R&R coaching and develop online resources this year as trainees develop their research plans.

Based on the popularity of a trial mini-course, we will start to offer a quarter-long course in the next academic school year for the fall, winter, and spring. "Introduction to R for Data Analysis" teaches R, an open-source programming language for statistical analysis, focusing on the computational aspects of reproducible research and transparency in scientific publication. In particular, students are introduced to the idea of a computational notebook that integrates well-formatted text with computer code and output, including graphics. Using this explicit notebook style of computation, they are asked to replicate at least part of an analysis from a published article. They also compile a short project notebook showing the exploration and graphical presentation of data from their own laboratory experiments. The course is taught using both lecture and live-lab formats, along with required at-home background reading, and numerous problem sets for practice. The course has been explicitly designed for Biosciences PhD students; the examples are drawn from data manipulation challenges they are likely to encounter using biological data. Biosciences PhD students are given priority registration for the class. We are also planning an equivalent version of the course for the Python language and are exploring creating a new course, "Computer Science for Biologists."

The Data Studio through our new Department of Biomedical Data Science (formed in 2015) also provides specialized focus in rigor and reproducibility for our students and postdocs. Most sessions are an extensive and in-depth consultation for a researcher based on research questions, data, statistical models, and other material prepared by the researcher with the aid of a facilitator. During the Data Studio, the researcher explains the project, goals, and needs. Experts in the area across campus are invited to contribute to the brainstorming. Drop-in consulting is also available pairing students and postdocs with faculty experts in data science to provide assistance with research questions and data analysis.

Responsible Conduct of Research

All Stanford graduate students and postdocs are required to receive instruction in the responsible conduct of research. For our trainees, this formal training takes place in two ways through the Stanford Center for Biomedical Ethics.

During their first year, every Immunology trainee (and every student enrolled in the Stanford-wide graduate Biosciences program) takes MED 255 (The Responsible Conduct of Research), an 8-hour course taught by the Center's professional staff. MED 255 is offered in multiple sections throughout the academic year; each session meets from 9 am-5 pm on a Saturday or Sunday during the year. This facilitates timely participation of trainees, and helps avoid scheduling conflicts with other activities. The course is available in two tracks, one for basic researchers, which is taken by our trainees, and one for clinical and medical researchers. Current instructors include David Magnus, PhD (Thomas A. Raffin Professor of Medicine and Biomedical Ethics), Holly Tabor, PhD (Associate Professor of Medicine), Maren Grainger Mosen, MD (Senior Research Scholar), and Katrina Karkazis, PhD (Senior Research Scholar). The course website is at <http://bioethics.stanford.edu/education/rcr/>. The topics covered by each session include: (1) conflict of interest; (2) policies regarding human subjects; (3) mentor/mentee responsibilities; (4) collaborative research; (5) peer review; (6) data acquisition; (7) research misconduct; and (8) contemporary ethical issues. In addition to offering MED 255, the Center offers programs, seminars, and journal clubs in a number of areas including Neuroethics, Stem Cells and Society, and Integration of Research on Genetics and Ethics, as well as a program in Bioethics and Film. These programs are available for any interested trainees to attend. More information can be

found at <http://bioethics.stanford.edu/>.

Our students also have the opportunity to enroll in other ethics-related courses, including 22 SoM courses pertinent to research ethics. The Graduate School of Education offers two courses related to ethics and the Law School offers one research ethics course.

2. Ensuring sufficient start-up funding to permit early-stage faculty to participate in training, and bridge funding to ensure that training may continue if a mentor experiences a hiatus in funds

Per SoM policy, start-up funds are provided and documented in offer letters. The Office of Academic Affairs and Faculty Compensation reviews offer letters to ensure start-up funds are adequate. Start-up funds cover research expenses typically for the first 3-4 years, including supplies, equipment, and personnel. In some departments, start-up also includes assistance with housing and salary (if not covered by funding). Bridge funding is provided in the case of a hiatus in funding. Bridge funding in clinical departments is decided at the department level. In basic science departments, investigators can access bridge funding up to a total of \$200,000.

3. Supporting core facilities and technology resources, and describing how they can be used to enhance training

As detailed in this application, the predoctoral trainees in this program benefit from outstanding facilities and resources provided by Stanford University and its schools (see <http://corefacilities.stanford.edu/>). The extraordinary level of investment of the University and schools in the research environment – new buildings, centers and institutes, shared instrumentation facilities, and other research resources – has played a large role in building outstanding laboratory research environments.

For example, the following state-of-the-art buildings highlighted below - among others - are core to this program:

- Center for Clinical Sciences Research (CCSR) is a 4-story, 214,000-square-foot building that promotes translational research and bench-to-bedside approach to medical research, housing both basic science and clinical science faculty.
- Clark Center is a 3-story, 146,000-square-foot research building that brings together disciplines including biology, medicine, chemistry, physics, and engineering.
- Bass Biology Research Building is a 5-story, 133,000-square-foot building dedicated to research in the life sciences, and is in close proximity to other departments including computer science, statistics, and engineering to promote collaborations and interactions among faculty and students from different academic disciplines.
- Lokey Stem Cell Research Building is a 4-story, 200,000-square-foot building and the largest of its kind in the country dedicated to stem cell research.
- Li Ka Shing Center for Learning and Knowledge (LKSC) is a 4-story, 120,000-squarefoot building that brings together cutting-edge education and advanced technology. The fourth floor is dedicated exclusively to students (graduate and medical), and provides them with a variety of study, reflection, and social spaces in which to work, connect with their peers, work out, and relax. A lounge, kitchen, entertainment area, and a rooftop terrace create a stress-free environment to complement a large variety of study spaces, and a project rehearsal area provides students with a state-of-the-art space to practice key presentations.

In addition, two planned facilities will be completed in 2019:

- Biomedical Innovation Building (BMI): This 215,000-square-foot structure will be located on open space just steps from the new Stanford Hospital. It will house laboratories and support space for nearly 1,000 faculty, students and staff in various

specialties including space for the Immunity, Transplantation and Infection Institute, Immunology faculty and administrative staff. The BMI will foster scientific collaborations by bringing together multidisciplinary teams of engineers, basic scientists, and physician-researchers in a modern and technologically advanced facility and inspire ways for different disciplines to work together on basic, translational and clinical studies.

• The Wu Tsai Neurosciences Institute and ChEM-H (Chemistry, Engineering & Medicine for Human Health) are interdisciplinary research institutes designed to bring faculty from many disciplines together to create novel interactions. Both institutes will be housed in a new 235,000-square-foot building that will be home to 40 laboratories including Immunology faculty labs, core research facilities, meeting spaces, and a pub.

The University contributes in many ways to the support, success, and advancement of our graduate students. Stanford University's unique environment fosters training of the very best students in interdisciplinary research. The SoM, as well as key partners across campus, including Biology and Chemistry in the School of Humanities and Sciences (H&S), as well as Bioengineering and Computer Science in the School of Engineering (SoE), are among the best in the world and are in close proximity, helping sponsor frequent interactions and collaborations.

4. Providing adequate staff, facilities, and educational resources to the planned program

Our graduate education curriculum aims to empower students both academically and professionally. In the summer prior to the first year, our students participate in an online orientation led by faculty and senior students. The orientation is designed to help them transition from undergraduate and other pre-graduate school pursuits and to hit the ground running. This level of commitment to student success continues into the first year with our innovative "Foundations in Experimental Biology" course designed to facilitate students' critical first steps toward becoming independent scientists – the transition from being consumers of information to producers of knowledge. Throughout their training, our students have the opportunity to enroll in mini-courses that are one- to three-week intensive classes that give them an opportunity to learn more about a specific biosciences field or develop a new skill.

Our home programs and T32 programs are committed to providing academic advising in support of graduate student scholarly and professional development. When most effective, this advising relationship entails collaborative and sustained engagement by both the advisor and the advisee. The program director serves as the faculty advisor for all matriculating students to help them design their academic program; this role transitions to the PhD advisor once trainees have joined a laboratory. Faculty advisors are expected to guide students in key areas such as selecting courses, designing and conducting research, developing of teaching skills, navigating policies and degree requirements, and exploring academic and professional opportunities.

In addition, the SoM Dean's office centrally tracks all Thesis Committee meetings to ensure our graduate students receive the guidance and support they deserve. We have also structured a systematic Individual Development Plan (IDP) program for all Biosciences PhD candidates and postdoctoral scholars. The IDP program was developed through extensive consultation with multiple groups of faculty, students and staff. Standardized IDP forms, specifically tailored to each stage of a trainee's progress through graduate school and postdoctoral training, comprehensively assess each trainee's academic, professional and career progress, and create a clear action plan toward achieving goals and milestones in those areas. Stanford has a tracking system to ensure every NIH-supported Biosciences PhD candidate completes an IDP and meets at least once annually with his/her advisor for discussion.

Through the Office of Graduate Education, we aim to help train and empower the next generation of leaders and innovators within and beyond academia and industry. Our functional areas include operations and administration, wellness and development, curricula, admissions, and diversity and inclusion. Our office offers programs and services to support graduate

students and sustain the level of excellence achieved by the Stanford Biosciences. Through BioSci Careers, formerly the SoM Career Center, we support graduate students and postdoctoral scholars with career mentoring and connections, individualized counseling, curricula with exposure to myriad career choices, and development of scientific and leadership skills.

Finally, the SoM Dean's office supports all T32 training grant directors by hosting a quarterly meeting to share best practices and discuss topics of interest, and both the SoM and H&S Dean's offices carry out official program reviews, including interdepartmental, departmental, and T32 program reviews. Dr. Will Talbot (Senior Associate Dean of Graduate Education and Postdoctoral Affairs) is also in frequent contact with students in all of the Biosciences home programs, who serve as more informal avenues to convey any concerns or suggestions about student training.

5. Ensuring faculty have protected time devoted to mentoring, training, and research

Each faculty member's percent effort with respect to teaching (mentoring, training), research, clinical care, and administration is articulated and reviewed regularly (usually annually) by the department. SoM recognizes the critical importance of mentoring trainees and faculty and will ensure that you will have adequate time as part of your University and department roles to direct this outstanding training program. Training grant faculty are also given the necessary time to excel as faculty mentors and are encouraged to participate in various programs to enhance their skills in leadership, teaching, and mentoring.

6. Promoting diversity and inclusion at all levels of the research training environment (trainees, staff, faculty, and leadership)

Stanford Biosciences is committed to fostering a diverse community in which all individuals are welcomed, respected and supported to achieve their full potential. We value diversity because we believe that interaction with people with unique backgrounds and life experiences allows us to reach a new level of innovation in education, scientific research, and medicine. Further, we believe that a student body that is highly qualified and diverse – in gender, race, ethnicity, socioeconomic background, sexual orientation, and work-life experiences – is essential to a deep and transformative educational process. Stanford commits substantial resources and effort toward recruiting a diverse student cohort to its Biosciences PhD programs. Since 2014, diversity in our student population has increased (~22-25% URM incoming students in recent years). Successful PhD recruitment programs and mentoring programs are listed below:

- Stanford Summer Research Program (SSRP)/Amgen Scholars Program, a fully funded residential internship program for underrepresented minority undergraduates who are interested in pursuing PhD programs in the biomedical sciences. Since the program's inception, Stanford has trained more than 500 talented undergraduate students from diverse backgrounds, and 97% of the participants went on to pursue advanced degrees.
- Stanford Preview, a three-day program jointly sponsored by the Stanford Biosciences and the Stanford Black Bioscience Organization, is designed to introduce sophomores and juniors from diverse backgrounds to the Stanford campus and to provide guidance for the graduate school admissions process.
- The Diversity Excellence Program, led by the Biosciences Diversity Advisory Council (with eight faculty) and Ayodele Thomas, Associate Dean for Graduate and Career Education and Diversity, provides financial support to interview a diverse group of students and encourages departments to proactively identify diverse and high achieving candidates, employing measures beyond traditional assessment tools, such as GPA and GRE scores.
- ADVANCE, an eight-week intensive summer transition program, supports the success and retention of incoming graduate students from underrepresented and disadvantaged backgrounds. Participants in the program engage in activities centered on academic

development, professional development, and community building – all of which seek to prepare them for a successful graduate career at Stanford. The program strives to foster community, leadership, and excellence in an interactive learning environment.

In 2015, Dr. Lloyd Minor (Dean of the SoM) formed the Dean's Task Force on Diversity and Societal Citizenship. With a focus on enhancing the student and trainee experience and empowering them to become societal leaders, the Task Force explored challenges and outlined a five-year strategy focused on (1) increasing diversity and promoting inclusion; (2) enhancement of the educational curriculum to promote societal citizenship and increase awareness of societal issues and ways for advocacy; and (3) ensuring accountability for diversity across all levels of leadership. In 2017, Dean Minor formally charged the Stanford Medicine Diversity Cabinet to advise the Dean and SoM leadership, disseminate communication, and provide coordination across the myriad of diversity- and inclusion-related initiatives with Stanford Medicine. The Cabinet reports directly to the Dean and includes faculty, staff and trainee representatives from the Stanford SoM, Stanford Hospital, and Lucile Packard Children's Hospital.

Further, the Diversity Center of Representation and Empowerment, or D-CORE, was established in October 2017 to provide a physical location where any member of the Stanford Medicine community interested in issues of inclusion and diversity can hold meetings or support groups, or just hang out and study. It includes a space for prayer and meditation, and diversity focused staff hold regular office hours to increase engagement with and support for students of all backgrounds.

7. Ensuring the research facilities and laboratory practices promote the safety of trainees

Safety is a core value at Stanford, and the University is committed to continued advancement of an institutional safety culture with strong programs of personal safety, accident and injury prevention, wellness promotion, and compliance with applicable environmental and health and safety laws and regulations. Stanford University makes all reasonable efforts to: (1) promote occupational and personal safety, health and wellness; (2) protect the health and safety of Stanford University faculty, staff, and trainees; (3) provide information to faculty, staff, and trainees about health and safety hazards; (4) identify and correct health hazards and encourage faculty, staff, and trainees to report potential hazards; (5) conduct activities in a manner protective of the environment, and inform the Stanford community regarding environmental impacts associated with institutional operations; and (6) maintain a risk-based emergency management program to reduce the impact of emergency events to the Stanford community. Faculty, staff, and trainees are responsible for: (1) keeping themselves informed of conditions affecting their health and safety; (2) participating in safety training programs as required by Stanford policy and their supervisors and instructors; (3) adhering to health and safety practices in their workplace, classroom, laboratory, and student campus residences; and (4) advising of or reporting to supervisors, instructors or Environmental Health and Safety potentially unsafe practices or serious hazards in the workplace, classroom or laboratory. Stanford's program for providing a safe workplace for faculty, staff, and trainees includes: facility design; hazard identification, workplace inspection, and corrective action; shutdown of dangerous activities; medical surveillance; and emergency preparedness.

8. Ensuring the research facilities are accessible to trainees with disabilities

Stanford Biosciences supports the recruitment, enrollment and graduation of students with disabilities. The Vice Provost for Graduate Education's diversity statement (<http://vpge.stanford.edu/diversity/>) includes disabled students, and the Stanford Office of Graduate Admissions clearly states our policy of non-discrimination, including prohibiting discrimination based on disability (<https://studentaffairs.stanford.edu/policies>). Furthermore, the application and recruiting materials for Stanford Biosciences programs all indicate Stanford's full compliance with the Americans with Disabilities Act and the Stanford Biosciences webpage

includes a link to the Office of Accessible Education, which provides resources to all students on campus with disabilities (<https://studentaffairs.stanford.edu/oe>). All of Stanford's research facilities are fully accessible to researchers with disabilities, and we are fully committed to providing any necessary accommodations for disabled students. While it is not required for applicants to declare any physical or mental disabilities they may have during the admissions process, those who self-identify as having a disability are invited to attend our Bioscience Annual Diversity Luncheon. Representatives from the Office of Accessible Education attend orientation events and distribute materials on disability accommodations.

9. Ensuring a positive, supportive and inclusive research and training environment for individuals from all backgrounds

The SoM provides an environment of personal and professional exploration, allowing students and postdocs to define and follow their own path to success. The students have full access to the undergraduate, graduate, and medical curricula to supplement and enhance their educational and training experience. Throughout their PhDs, our graduate students have the opportunity to enroll in courses in the SoM, H&S, and SoE. Our unique location in the middle of Silicon Valley – as well as the co-location of SoM and H&S with the rest of Stanford's campus – allows for diverse connections to interdisciplinary collaborations and opportunities in and out of the lab. The curriculum reflects this interdisciplinary perspective by also offering access to courses in other schools including Business, Education, and Law. Stanford faculty, alumni and staff offer trainees the mentoring and resources to succeed in a wide range of careers.

The following SoM programs are also instrumental in enriching the research and training environment for students from all backgrounds:

- The Stanford Biosciences Grant Writing Academy, sponsored by the office of Dean Talbot, supports trainees in creating proposals and productive writing practice; teaches trainees to write and edit efficiently; empowers trainees to elicit and provide effective feedback; and provides coaching, editing, and review of proposals and scientific writing. Proposals submitted by SoM graduate students have nearly doubled since the Academy was founded in 2014. The applicant success rate has remained stable at almost 30%, hence awarded NIH fellowships to graduate students have doubled since the Academy was founded.
- The Wellness Matters program, sponsored by Dean Talbot's office, provides curricula, programs, and support for our graduate students that promote self-care, resiliency, and holistic personal health, helping to create an environment in which all graduate students can thrive. On a related note, all students have access to health insurance, counseling, and psychological services.
- The mission of the Student Outreach to Alumni Resources (SOAR) Mentor Program is to foster mentorship opportunities across the Stanford Biosciences community. This comprehensive mentoring program exposes students and postdocs to a breadth of career options and pathways, promoting greater community and collaboration with alumni.
- The Solidarity, Leadership, Inclusion, Diversity (SoLID) Mentorship Program connects graduate students with faculty who can provide additional mentorship to guide and support students on issues that may be largely outside of their research, such as mental health and wellness, academic activism, microaggressions, and imposter syndrome, among others.

Our multi-faceted mentoring approach allows graduate students and postdocs to be matched with peer and/or professional mentors of their choosing in addition to their faculty advisor. Trainees can opt to be matched with multiple mentors, thereby increasing the breadth of advice they receive.

The following University units are also essential in providing a supportive environment to our trainees:

- The Office of the Vice Provost for Graduate Education (VPGE) offers a complementary set of programs and events for Stanford graduate students in any discipline to help students grow academically and professionally. In addition, VPGE sets policy and provides programs related to advising and mentoring, diversity, professional development, interdisciplinary learning, and fellowships and funding. VPGE has provided guidelines for advising relationships between faculty and graduate students. In making expectations explicit, faculty advisors and students gain a shared understanding of Stanford's commitment to best practices that establish clear communication within faculty-student advising relationships.
- BEAM, Stanford Career Education also offers a complementary set of programs and events for our PhD and postdoc communities that focus on the academic track and the non-academic track. Examples include Jumpstart Your Academic Job Search, Academic Job Search: Negotiating Faculty Job Offers, and PhD Pathways.

Two key student organizations – the Stanford Biosciences Student Association (SBSA) and Biomedical Association for the Interest of Minority Students (BioAIMS) – welcome students from all backgrounds. SBSA's mission is to represent students studying biosciences at Stanford in the SoM, SoE, and H&S, and to enhance their quality of life by hosting social and academic events. BioAIMS addresses the needs and concerns of current minority graduate students in the biosciences through advocacy and programming.

In addition, Stanford has excellent centers committed to coordinating students' extracurricular and cultural activities and professional development. These centers include the Graduate Student Center and Cultural Community Centers for students from (or with interest in) the Latino, African American, Native American, Asian American, International, and LGBTQ communities on campus.

10. Ensuring that proper policies, procedures, and oversight are in place to prevent discriminatory harassment and other discriminatory practices and to appropriately respond to allegations of such discriminatory practices, including providing any required notifications to NIH

Stanford has long shared NIH's concerns regarding issues of harassment and discrimination. We take pride in welcoming students, faculty, staff, and postdocs of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, veteran status, or marital status. Like the NIH, Stanford prohibits unlawful harassment including sexual harassment and sexual violence. Stanford also does not tolerate unlawful discrimination on the basis of these or any other characteristic protected by applicable law in the administration of the University's programs and activities.

There are policies in place to define and address discriminatory harassment concerns on our campus, including:

- Sexual Harassment: adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-1
- Consensual Sexual or Romantic Relationships In the Workplace and Educational Setting: adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-2
- Prohibited Sexual Conduct: Sexual Misconduct, Sexual Assault, Stalking, Relationship Violence, Violation of University or Court Directives, Student-on-Student Sexual Harassment and Retaliation: adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-3
- Equal Employment Opportunity, Non-Discrimination, and Affirmative Action Policy: adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-4

There are three main Stanford entities that are concerned with prevention of and response to varying forms of discriminatory harassment. These entities are engaged depending on the

population that is impacted and the nature of alleged harassment. The Sexual Harassment Policy Office (harass.stanford.edu/) and the Office of Sexual Assault and Relationship Abuse (SARA) address sexual harassment concerns and provide education and training across all University populations; the Title IX Office (titleix.stanford.edu/) specifically address these concerns for student populations. For harassment issues that are not solely sexual, Stanford's Diversity and Access Office (diversityandaccess.stanford.edu/) sets non-discrimination policy that impacts the entire campus.

11. Ensuring that trainees will continue to be supported when they transition from the training grant to other sources of support

The SoM covers all student expenses not provided by the training grant, including a stipend considerably higher than the training grant minimum to reflect the high cost of living in the Bay Area. There are funds to provide students the ability to carry out research in their lab of choice across all our Home Programs, so that students have the opportunity to pursue their passions in research topic and lab. SoM covers expenses for MPTP students, which includes years 1 and 4, when they are not appointed to the training grants. For students in year 5 and up, the PIs are responsible for their funding support. The University also offers Stanford Graduate Fellowships, which cover full tuition and stipend for a significant proportion (currently approximately 20%) of our students.

12. Providing resources and expertise for evaluating program training

In 2015, in partnership with our 14 home programs, Stanford Biosciences developed a central repository of PhD alumni information to track alumni outcomes from those that graduated since 2000. We organize alumni data to include geographic representation, employers, job sectors, academic details, and industry details. To date, we have evaluated outcomes for 1,593 alumni from 2000 to 2018 including training grant participants. Our goal is to track our PhD alumni annually to understand their career choices, including job sectors, job titles, employers, and geographic locations. All data is stored in the Graduate Student Tracking Alumni Module and shared with the home programs. In addition, we have invested resources into developing T32 websites modeled after your training program (<http://med.stanford.edu/molpharmprogram.html>) to highlight training grant alumni outcomes.

In sum, we are very appreciative of your outstanding leadership and are excited to have you at the helm of this important training program. We share your enthusiasm for promoting the best possible research and training in the area of Immunology by facilitating and cementing interdepartmental and interschool ties among trainees and faculty in these areas. Thus, we support your application in the strongest possible terms, and we hope that the NIH will support this highly successful and innovative program.

Sincerely yours,



William S. Talbot, PhD
Professor of Developmental Biology
Senior Associate Dean for Graduate Education and Postdoctoral Affairs