



May 14, 2021

Dr. Gavin Sherlock
Professor of Genetics
S201A Grant Building
Stanford School of Medicine

Dr. David Kingsley
Professor of Developmental Biology
B300 Beckman Center
Stanford School of Medicine

Re: NIGMST32 Application for Genetics and Developmental Biology

Dear Drs. Sherlock and Kingsley,

I am writing to express my strong and enthusiastic support for your NIGMS T32 application for the Genetics and Developmental Biology (GENETICSDEVBIO) Training Program at Stanford. GENETICSDEVBIO is integral to our efforts to train scientists who can do innovative science in an interdisciplinary manner with key implications for health and disease. I am committed to helping this program's innovation and success in graduate training and research. Below we highlight the fifteen 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. The University maintains a Research Policy Handbook, which describes policies on the conduct of research, faculty responsibilities to staff and students, authorship, non-discrimination in research agreements, misconduct, and retention and access to data. The schools provide RCR coursework and workshops, which cover research integrity and experimentation, to students. In addition, schools offer a combined 58 graduate-level courses on experimentation and statistics. Courses and trainings to highlight in general and specific to this program are:

- Genetics and Developmental Biology Training Camp includes sessions on programming, hands-on data analysis and good study design.
- Foundations in Experimental Biology course for first-year graduate students in the SoM is designed to facilitate students 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.
- Foundations of Statistics and Reproducible Research is a planned mini-course customized for first year bioscience students covering basic principles of experimental design, analysis, and statistical reasoning as well as tools and practices to make research reproducible.
- The Practice of Reproducible Research is a planned mini-course that covers data management practices and computational approaches to facilitate version control, reproducible workflows, and data archiving.
- The Stanford Library offers regular workshops that cover writing useful project documentation, employing version control, creating pre-analysis plans, and enhancing scientific workflows by implementing open source

tools. Such Open Source tools are also being developed here at Stanford, including the OpenfMRI tools and data-sharing platforms developed by the Stanford Center for Reproducibility in Neuroscience, which also serves to further discussion about reproducibility on campus. Likewise, the Meta-Research Innovation Center at Stanford (METRICS), which aims to transform research practices to improve the reproducibility, efficiency and quality of scientific investigation, offers courses and webinars on methods, evaluation, reporting, and reproducibility that are available to all. These offerings are enhanced by the NIH training modules on Rigor and Reproducibility, which are made known to all trainees on T32s and other training grants requiring that content. The GENETICSDEV BIO training program also promotes R&R and RCR prominently in their joint seminar series, joint journal club, research talks, and monthly Professional Skills' meetings.

Responsible Conduct of Research (RCR): 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 through the Stanford Center for Biomedical Ethics. During their first year, every trainee in the 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. Topics 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. Our trainees also have the opportunity to enroll in other ethics-related courses, of which the SoM offers 22 additional courses related to research ethics. The School of Education offers 2 courses related to ethics and the Law School offers 1 research ethics course. Faculty in your own GENETICSDEV BIO T32 program have led the development of BIOS258 (Ethics, Science and Society), a refresher course for students in advanced years of training. This course, in addition to the ongoing training you provide by regular discussion of RCR topics in the Professional Skills monthly meetings with your GENETICSDEV BIO training faculty, ensure that your students are trained in the responsible conduct of research throughout their time in graduate school.

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 startup 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 3 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 SoM basic science departments, investigators can access bridge funding up to \$200,000 total.

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. 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 state-of-the-art buildings highlighted below - among others - are core to this program:

- The Beckman Center for Molecular Genetic Medicine is a modern research building that houses many laboratories from the Department of Developmental Biology and Genetics. This building is also home to the Fly Center that provides Drosophila support services, and the Beckman Cell Sciences Imaging Facility which provides high resolution, state-of-the-art light, fluorescence, two-photon, confocal, and electron microscopy technologies for imaging and analyzing the molecular and structural organization of cells, embryos, and tissues. Fluorescence activated cell sorting was invented at Stanford, and the Shared FACS facility for separation and detailed analysis of cell types is also housed in the Beckman Center.
- Biomedical Innovation Building (BMI) is a new 215,000-square-foot structure located just steps from the new Stanford Hospital and the Beckman Center for Molecular Medicine. It houses laboratories and support space for nearly 1,000 faculty, students and staff in various specialties, including many laboratories from the Department of Genetics. The BMI fosters scientific collaborations by bringing together multidisciplinary teams of basic scientists, engineers, and physician-researchers in a modern and technologically advanced facility.
- The Lorry Lokey Stem Cell Research Building is a new 200,000 square foot building that is also steps away from the Beckman Center and BMI building. Lokey houses laboratories working on stem cell biology, cancer, and neuroinnovation. The building design features open laboratories and communal gathering spaces that encourage interaction and teamwork between researchers from many different fields, and the development of novel conditions for purifying, culturing, and differentiating stem cells into many different tissues.
- Genetics Bioinformatics Service Center (GBSC) is a School of Medicine service center operated by Department of Genetics. GBSC is set up to facilitate massive scale genomics at Stanford and supports omics, microbiome, sensor, and phenotypic data types. The center maintains an on-premises computational cluster specifically suited to large scale genomics data analysis, 700+ bioinformatics software packages installed and ready to use, and provides a bioinformatics consulting service that supports analysis of popular genomics data types such as RNA-Seq, ChIP-Seq, MethylSeq, Whole Genome/Whole Exome Seq, CancerSeq, and Microbiome, and analysis for new data types like Hi-C and ATAC-Seq. Along with secondary analysis, the center provides consulting in quality control, downstream tertiary analysis, data interpretation and visualization.
- The Veterinary Service (VSC): Stanford provides centralized facilities for maintenance of many different animal species, including both traditional model organisms like mice and zebrafish, as well as many emerging models including non-human primates (mouse lemurs, cynomolgus and rhesus monkeys), pigs, dogs, birds, amphibians (axolotls, *Xenopus laevis* and *tropicalis*), and several other fish systems (including sticklebacks, cichlids, and killifish). Animal housing rooms and procedure rooms are located in close proximity to each other and to the researchers who use them. Stanford has also set up core services for generating knockout and transgenic mice, behavioral testing of mouse models, and a small animal imaging facility in the Center for Innovation in In Vivo Imaging (SCI3), thus facilitating innovative study of gene function across a wide range of model systems.

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. 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. In his role as Advising Dean of Graduate Education and

Postdoctoral Affairs, Dr. David Schneider meets with trainees regularly and advises them on issues ranging from academics to wellness. 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 teaching skills, navigating policies and degree requirements, and exploring academic and professional opportunities.

The office of Dr. Sheri Krams, as Senior Associate Dean (SAD) for Graduate Education and Postdoctoral Affairs, centrally tracks all Thesis Committee meetings to ensure our graduate students receive the guidance and support they deserve. The SAD office has 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.

Through BioSci Careers, we support graduate students and postdoctoral scholars with individualized counseling, curriculum, career mentoring, and connections, including BioSci Connect, a new online Biosciences alumni mentoring platform to connect alumni to our PhD students and postdocs in support of their professional and career development. 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 my office carries out official program reviews, including interdepartmental, departmental, and T32 program reviews. In addition, in her SAD role, Dean Krams is in frequent contact with students in all of the Biosciences home programs to address any concerns or suggestions about student training

5. Supporting the PDs/Pis and other key staff associated with the planned training program. The GENETICSDEV BIO training program faculty consists of 65 individuals with outstanding records of scholarship. The program selects faculty mentors from multiple departments within the University, dedicated to research, mentoring and teaching and is well-balanced between senior faculty with established track records in graduate training and junior faculty. The program assigns a supportive mentor from the senior faculty to each Assistant Professor to ensure that students are well trained and mentored. In addition, GENETICSDEV BIO training grant director Dr. Sherlock is also Co-Director of the Medicine Teaching and Mentoring Academy, and has played a leadership role in developing training workshops in mentoring skills for faculty at all levels. Mentors in the Biosciences Umbrella Program have an average of 1-2 graduate students, ensuring that student-advisor interactions remain personal and direct. In addition, the program has administrative staff dedicated to student support.

6. Fostering and rewarding excellence in training. Stanford ensures 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 both 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 the Biosciences Faculty Mentor Training Workshops. Topics include Mentor/Mentee Communications; Trust, Conflict Management, Building Better Communication; Trainee Career and Professional Development; Addressing Equity and Inclusion; Culturally Sensitive Mentoring; Ethics and Responsible Research; Supporting Trainee Wellness; and Negotiation.

Stanford also considers activities integral to excellent graduate training (such as teaching and mentorship) in all tenure and promotion decisions. For the University Tenure Line (UTL): Excellence in scholarship, teaching, and mentoring (and clinical care, if applicable) is an important prerequisite for a tenured appointment at Stanford because the University is dedicated to outstanding achievement in all of these domains. The purpose of the appointment, reappointment, or promotion evaluation is to appraise, on the basis of the record to date, the candidate's standing in and impact on his or her scholarly discipline (broadly defined) and the candidate's quality as a teacher and mentor (and as a clinician, if applicable). The second criterion for a UTL appointment is promise – or a record demonstrating – that the candidate is capable of sustaining a first-rate teaching program during his/her Stanford career.

Teaching is broadly defined to include: the classroom, laboratory, or clinical setting; advising; mentoring; program building; and curricular innovation. Teaching may include undergraduates, graduate students, medical students, residents, postdoctoral fellows and in postgraduate and continuing medical education. It is recognized that many tenure-line faculty in clinical departments teach in small group sessions or with individual trainees.

Stanford's Vice Provost for Faculty Development and Diversity (VPFDD) provides key resources to faculty to support their development within UTL criterion. The office plans and executes New Faculty Orientation each fall. The office also provides faculty professional development including mentoring and leadership. SoM's Teaching and Mentoring Academy (co-directed by Dr. Sherlock) promotes excellence in teaching and mentoring by developing, supporting and recognizing dedicated educators and mentors to ensure world-class training for the next generation of physicians, researchers, and educators. SoM also offers faculty development/professional development workshops, leadership programs, and networking through the Office of Academic Affairs and Office of Faculty Development and Diversity.

7. Supporting the remediation or removal of Participating Faculty from the program who are poorly performing mentors. Your program regularly reviews training faculty performance based on mentoring record and active participation in program activities including teaching, admissions, qualifying exams, thesis committees, and presentations in Professional Skills discussions and GENETICS/DEVBIO research symposia. My office gives full authority to the T32 program directors to remediate or remove participating faculty from the program who are poorly performing mentors based on their set of guidelines and policies. The SAD office assists in monitoring of faculty-student mentoring by maintaining a central system for tracking of required Independent Development Plan discussions held each year between students and mentors, and notification of faculty and program directors of non-compliance with required mentoring activities and training. The SAD office is also available to assist the program if remediation or removal of participating faculty is needed because of poor performance. In addition, the School of Medicine has established an Office of the Ombudsperson to provide a neutral, confidential and independent resource for dispute resolution for faculty, residents, postdoctoral scholars and students. The office assists members of the School of Medicine community with any work related difficulty, including interpersonal conflict or misunderstandings, as well as academic or administrative concerns.

8. 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. These diversity commitments complement the many programs at the SoM and Stanford including the diversity inclusion initiative IDEAL (Inclusion, Diversity, Equity, and Access in a Learning Environment) launched in 2018. IDEAL works across the entire University community to ensure that diversity of thought is represented, that all members of Stanford feel that they belong, are supported, and have access to opportunities and benefits of the University. 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. 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, 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% went on to pursue an advanced degree.
- 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 assessments such as GPA/GRE.
- 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 addition, 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. Diversity-focused staff hold regular office hours to increase engagement with and support for students of all backgrounds.

Office of the Vice Provost for Faculty Development and Diversity (VPFDD) has a guidebook for departments when conducting faculty searches, "Building for Excellence: Inclusive Practices for Faculty Recruitment and Searches." The University also funds programs to recruit diverse faculty to Stanford: the Faculty Incentive Fund supports incremental appointments that bring diversity to departments and schools; Gabilan Provost's Discretionary Fund ensures that resources are available to recruit women in the sciences and engineering; VPFDD provides faculty retention strategies with a concentration on department climate, salary and compensation, and access to University resources.

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 School of Medicine, School of Humanities and Sciences and School of Engineering. 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 Krams, 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 NIH fellowships to our students have doubled since the Academy was founded.
- The Wellness Matters program, sponsored by Dean Krams' office, provides curricula, peer mentoring, programs, and events targeted to the wellness needs of the Biosciences graduate students, and promotes self-care, resilience skills, and holistic health behaviors, helping to create an environment in which all graduate students can thrive. Popular events include Wellness First Fridays which features community building events once a month, and Mid-Quarter Recharge which provides stress-relieving activities. Additional successful events include wellness workshops, yoga/fitness classes, art, improv and trivia.
- 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, 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 trainee environment:

- 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. 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. 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 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.

11. Guaranteeing the research facilities are accessible to trainees with disabilities. The School of Medicine supports the recruitment, enrollment and graduation of students and postdoctoral fellows with disabilities. The Diversity and Access Office (DAO) ensures that the entire Stanford community has equal access to resources, facilities, and opportunities. The DAO provides technical assistance, training on assistive technology, transportation, lodging, recreation, community resources, event, and evacuation plans. The Vice Provost for Graduate Education's diversity statement includes students who have disabilities. The Office of Accessible Education (OAE) provides resources to all students and postdocs on campus who have disabilities, such as classroom and housing accommodations. 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 and postdocs. The Campus Access Guide is an online system of maps detailing accessibility information for buildings on campus, including research buildings.

12. 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 (e.g., requesting a change of PD/PI status; see NOT-OD-19-056). 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.

Stanford's Nondiscrimination Policy provides: Stanford University prohibits discrimination and harassment and provides equal opportunities for all community members and applicants regardless of their race, color, religious creed, national origin, ancestry, physical and mental disability, medical condition, marital status, sex, age, sexual orientation, gender identity, veteran status or any other characteristic protected by law.

Additionally, Stanford's prohibition on Sexual Harassment provides: Where sexual harassment has occurred, the University will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.

Specifically, to provide assurances as required by NOT-OD-19-029, on behalf of the University, we assure Stanford's institutional commitment in the following areas:

- Stanford University has proper policies, procedures, and oversight in place to prevent discriminatory harassment and other discriminatory practices;
- Stanford responds appropriately to allegations of discriminatory practices;
- Stanford has developed a protocol to inform NIH/the Office for Civil Rights in compliance with NOT-OD-15-152; and
- Stanford has adopted and will follow its institutional protocol for requesting NIH prior approval of a change in the status of the Program Director/Principal Investigator (PD/PI) or other key personnel to continue their role on the NIH award described in the training grant application as described in NOT-OD-18-172.

13. Providing trainees access to student support services, such as healthcare, counseling services, and housing

For healthcare, mental health and counseling services, our graduate students have full access to Vaden Health Services on campus, and CAPS-Counseling & Psychological Services. Graduate students also have access to a Mental Health Team of therapists and a psychiatrist through the SoM. Cardinal Care, the university sponsored health insurance option, is a comprehensive plan specifically designed for Stanford students and also provides coverage for eligible enrollees during leaves of absence, school breaks, immediately following graduation, and in quarters when students might not be registered for classes. The cost of Cardinal care is subsidized by the Dean's office, department, and PI funds. Additional funds are also available for students who have unexpected medical expenses through the Stanford Emergency Grant-in-Aid and the Biosciences Hardship Program. Additionally, students can receive non-clinical wellness support for a variety of needs through Well Being at Stanford Coaching, the Office of Graduate Education, BioPeers, and other campus programs.

For housing, our graduate students are guaranteed on-campus or local housing with three options: (1) single graduate housing; (2) couples without children housing and (3) students with children housing. Stanford Graduate student housing rates are well below local housing rents, and include furnishings and basic utilities. Stanford's commitment to supporting graduate students is demonstrated by the recent opening of our newest on-campus housing community, Escondido Village Graduate Residences (EVGR). Completed in 2020, EVGR houses 2400 graduate students and features a marketplace, exercise and wellness rooms, community gathering spaces and more. EVGR is located within a few minutes walk or bike ride to all campus facilities, including the laboratories and shared core facilities utilized by the GENETICSDEVBIO training program.

14. 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. These funds are provided centrally via the Biosciences Scholars Program to allow 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 topics and lab. We prioritize top students for training grant support and encourage all eligible students to apply for external fellowship support; SoM will provide all support for GENETICSDEVBIO students when they are not appointed by the training grant, and when they transition off the training grant. For students in year 5 and up, the PIs are responsible for their funding support. The University offers Stanford Graduate Fellowships which supports exceptional incoming graduate students with full tuition and stipend for 3 years.

15. 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 to highlight training grant alumni outcomes, including the GENETICSDEVBIO T32 website (available at geneticsdevbio.stanford.edu).

Relationship to other training programs: Stanford currently has other NIGMS-funded predoctoral training grants, which support training in different research areas such as Biotechnology, Cellular and Biochemical Sciences, Chemical Biology, and Molecular Medicine. The GENETICSDEVBIO T32 training program is unique among these programs because it combines dual training in *hypothesis development* through high throughput genetics and genomics, and *hypothesis testing* using functional experiments across a range of both traditional and newly emerging model organisms. This is a particularly important training theme in 2021 and beyond. Genome-wide sequencing is currently being rapidly extended to many different vertebrate, non-vertebrate, and microbial and viral organisms, with the ambitious goal of sequencing much of the tree of life over the next 10 years. In parallel with this large scale sequencing effort, researchers have recently developed the ability to edit genomes *in vivo* and *in vitro*, and to use powerful methods in developmental biology to study previously inaccessible species and stages of development using cultured pluripotent cells and organoids. The training provided by the GENETICSDEVBIO T32 program will produce the next generation of scientists who can both take advantage of large-scale genomic information, and use it to make discoveries and advance fundamental knowledge through experimental tests in a variety of different organisms and developmental systems. The different training programs at Stanford synergize and share resources when appropriate. For example, as mentioned earlier, the IDP forms Dr. Kingsley helped develop have now been updated and are used across Stanford Biosciences. The joint training camp successfully developed for new entering graduate students in Genetics and Developmental Biology has helped catalyze the development of introductory training camps in other programs and departments as well. T32 directors from different training programs meet quarterly to compare programs and share best practices and experiences, so innovations developed in different program can be incorporated into others. The GENETICSDEVBIO co-directors and its training faculty are leaders in both research and education, and are supported by a large and highly competitive admissions program. Thus, the pool of faculty, trainees, and resources are highly robust to support the proposed program.

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

Sincerely,



Lloyd B. Minor, MD