FAVOR T32 FORMAL TRAINING IN TRANSLATIONAL RESEARCH: COURSEWORK

Trainees are expected to complete a series of formal, outlined base curriculum coursework concurrent with mentored clinical-translational research projects. Trainees are provided a unique experience of attending a series of FAVOR T32 Seminars, the TICR Summer Workshop which covers designing clinical research, statistics and data management, a scientific writing course, and a biostatistical methods course. Additional courses and seminars will be encouraged as appropriate.

Trainees should outline a curriculum of coursework that adds up to 100 hours in year 1 and 60 – 100 hours in year 2. The coursed under Base Curriculum are required, while the Specialized Training and Elective course are to be chosen at the mentee's discretion towards the best fit to the project.

The T32 will cover tuition fees up to $4500 for a non-degree seeking trainee and $16000 for degree seeking trainees. Degree seeking trainees must receive prior approval based on the planned coursework outlined in their initial proposal form. One position each year will recruit candidates that are interested in pursuing any one of these available degree programs at UCSF:

- Designing Clinical Research (1 month)
- Advanced Training In Clinical Research Certificate Program (ATCR) (1 year)
- Master's in Clinical Research (2 years; candidates interested in this program will be identified prior to starting the fellowship)
- Modern Methods in Drug Discovery (5 weeks)
- Idea to IPO (course in bio entrepreneurship, 12 weeks)
- Translational Challenges: Diagnostics, Devices &Therapeutics (12 weeks)
- Master's in Translational Medicine (1 year)

Milestones

Timeline for training program milestones	**Year 1**	**Year 2**	**Total**
Didactic Coursework (classroom hours)	100	60-100	**160-200**
Conference Presentations	4	4	**8**
Abstract Submissions	1	2	**2-3**
Department of Surgery Resident Research Program Presentations	1	1	**2**
National Meeting/Conferences	-	1-2	**1-2**
Original Manuscript Submissions	1	1-2	**2-3**
Grant application	-	1	**1**

BASE CURRICULUM: REQUIRED

These general courses/programs are required for all trainees.

1. Training in Clinical Research (TICR) Summer Workshop: 20 hours

The Summer Clinical Research Workshop (SCRW) includes four courses that are the starting point for all clinical research training at UCSF. These courses introduce the field of clinical research by providing instruction in the design of clinical research studies, collecting and managing clinical research data, and preparing for a career in clinical research. For individuals who will participate in clinical research in a supportive capacity, the Workshop alone is sufficient training. For others desiring to be independent investigators, the Workshop serves as introductory material for the more advanced ATCR Certificate and Master's Degree in Clinical Research Program.

Visit http://ticr.ucsf.edu/courses/summerworkshop.html for more detail on course information and the enrollment process of both TICR and ATCR.

- Designing Clinical Research. This course provides instruction in developing a clinical research question and creating a concise protocol that includes a literature review, study design, subject sampling and recruitment, instruments and other measurement approaches, sample size, consent form, budget and timetable. Each trainee reviews and supports the work of colleagues.
  Cost: $1942*
- Introduction to Statistical Computing in Clinical Research. This course adds statistical perspective and training to the design of clinical research and builds on the course above. Each trainee reviews and supports the work of colleagues.
  Cost: $1492*
- Database Management Systems in Clinical Research. Instruction in choosing the appropriate data management system; design of research databases; options in data entry; form and report generation; computer security; and budgeting for data management personnel and equipment.
  Cost: $1492*
- Opportunities & Challenges of Complex Biomedical Data: Intro to the Science of Big Data. An introductory course to the opportunities and challenges of using large datasets for biomedical research. It will cover topics such as what is big data, what big data can and cannot do, and phases of data science.
  Cost: $1698*

***tuition costs based on UC affiliation.**

2. Scientific Writing Course (Pamela Derish, DOS Publications Office) 20 hours

While residents are in training, the Department of Surgery's Publications Office provides support for producing a body of research publications that will increase their eligibility for job placement and advancement as academic surgeons by offering an intensive formal course in scientific writing. Since the ability to obtain extramural funding is critical to the success of young academic surgeons and scientists, and because grant writing requires a skillful blend of technical and non-technical writing that is targeted to a specific audience, the writing course devotes several weeks to proposal writing skills. The writing course is offered twice a year (Fall and Spring) and is held on 10 consecutive Wednesdays.

The course objective is for participants tos learn specific ways to marshal the details of a biomedical research paper or grant proposal into a clear, concise and comprehensible story that will be understandable to an interdisciplinary readership (papers), or meet the agency's review criteria (proposals). By carefully deconstructing published examples and their own writing, participants learn how precise word choice can eliminate jargon and ambiguities, how simple, direct sentences can describe complex science, and how organizing and developing ideas into paragraph form makes scientific writing logical and persuasive. Participants will also learn that although they may think they have described a concept, experiment, or result in an early draft, careful reading will typically reveal information gaps, unrecognized assumptions, and faulty reasoning. All of these problems can be fixed if the writer learns how to spot them, and how to revise them. The format of the course is as follows.

- Part 1: Writing fundamentals (word choice, sentence structure, and paragraph structure) (3 weeks).
- Part 2: Reports of original research (Introduction, Materials & Methods, Results, Discussion, Tables & Figures, Abstract and Title) (4 weeks; *other types of papers, e.g., review articles and case reports/ case series, are covered in online presentations designed by the instructor*).
- Part 3: Publication ethics and the peer review process (1 week)
- Part 4: Grant proposals (guest panel of NIH-funded scientists discuss the proposal writing and review process; developing hypotheses and aims; developing the Background, Significance, Preliminary Studies, and Methods sections (and for NIH grants specifically, the Approach section); Abstract and Title) (2 weeks).

The course combines didactic presentations with rewriting examples of unclear writing in class and outside of class. Weekly homework assignments include rewriting all or part of a manuscript written by the participant. Participants receive detailed feedback on their writing from the course instructor.
Visit http://sciencepubs.surgery.ucsf.edu/scientific-writing-course.aspx for more detail on course information and the enrollment process.
Cost: FREE for UCSF DOS residents; **$575** for non UC affiliated participants.

3. Biostatistical Methods for Clinical Research (BIOSTAT 200 - Judith Hahn) **36 hours**

The course is an introduction to the study of biostatistics covering types of data, their summarization, exploration and explanation. The trainees will look at concepts of probability and their role in explaining uncertainty, and end with coverage of inference applied to means, proportions, regression coefficients and contingency tables. Throughout the 13-week course, the trainees attend a combination of lectures and computer labs wherein the software program STATA will be used.

Visit http://ticr.ucsf.edu/courses/schedule/biostat200.html for more detail on course information and the enrollment process. **Cost: $2,230**

SPECIALIZED TRAINING

Translational Research Training: One to two-year research are marked with asterisk; two positions every year will recruit candidates that are interested in pursuing any one of these available degree programs at UCSF.

- Designing Clinical Research (1 month)
- Advanced Training In Clinical Research Certificate Program (ATCR) (1 year)*
  - Begins in August, 4 quarters.
  - Traditional Program: lower cost, but no transfer course credit towards and advanced degree. **Cost:** $22,344 with a possible offset of $7,603 with demonstration of academic excellence based on transcripts, publications & letters of rec, and concurrent enrollment as a UCSF/Berkeley resident post-doc fellowship program or registration as a student in a professional school/grad program at UCSF/Berkeley.
  - Credit-bearing Program: students will earn graduate division credits for ATCR courses. **Cost:** $22, 770 with a possible offset of $7,534 with demonstration of academic excellence based on transcripts, publications & letters of rec, and concurrent enrollment as a UCSF/Berkeley resident post-doc fellowship program or registration as a student in a professional school/grad program at UCSF/Berkeley.
- Master's in Clinical Research (2 years; candidates will be identified prior to starting the fellowship)*
  - **Cost:** $27,290 with a possible fee offset of $7,603 in the first year and $10,103 the second year with with demonstration of academic excellence based on transcripts, publications & letters of rec, and concurrent enrollment as a UCSF/Berkeley resident post-doc fellowship program or registration as a student in a professional school/grad program at UCSF/Berkeley.
  - Applications were accepted starting Jan. 1, 2020 and the deadline was May 31, 2020.
- Modern Methods in Drug Discovery (5 weeks)
- Idea to IPO (course in bio entrepreneurship, 12 weeks)
- Translational Challenges: Diagnostics, Devices &Therapeutics (12 weeks)
- Master's in Translational Medicine (1 year)*
  - **Cost:** $51,000 for CA residents and $63,000 for non-residents.
  - **Apply online using this link:** https://gradapp.berkeley.edu/apply/
  - **For detailed application instructions, visit:** https://uctranslationalmedicine.org/admissions/admissions-details/#gradapp
- Master's of Science in Global Health (1 year)*
  - **Cost:** $49,140
  - Apply using this link: https://gradapplication.ucsf.edu/security/login.aspx?ReturnUrl=%2f

ELECTIVES

These courses are "electives" offered to enable the trainees to develop the specialized skill sets and expertise appropriate for their specific area of research focus and long-term career goals. The choice of additional didactic coursework are individualized with each trainee working in close concert with their faculty mentors and the Steering Committee to design a course of specialized training that is specifically tailored. Specialized courses that cannot be audited require additional funding support from the Department of Surgery, and will be discussed with each trainee prior to enrollment.
The curriculum is designed taking into account the background, special interests and overall professional goals of the trainee so as to optimize their experience, productivity and chances for future success as an innovative, independent clinician-scientist. Accordingly, UCSF offers a broad range of course options relevant to three research tracks, including some certificate and master's degree programs. What follows are examples, not an exhaustive list of available electives. Many of these courses are offered through BMS and QB3 and can be audited at no cost.

Biomedical Sciences (BMS) Graduate Program

The graduate programs at UCSF offer various semester-long courses for general introduction of a research area and 3-week-long mini courses for more intense training in specific topics. Depending on the FAVOR trainee background and career interests, they may be advised by mentors to take these courses. Courses relevant to FAVOR trainees offered by the Biomedical Sciences (BMS) graduate program are provided below as examples.

BMS 225A: Introduces students to concepts in organ and tissue biology and to tools used in biomedical research. A series of lectures illustrate how tissues and organs function in the context of the whole organism, and how dysfunction leads to disease. Included in these lectures are examples of how a variety of model organisms can advance our understanding both of basic biology and of human illness. In addition, the course provides an opportunity through lectures and workshops for students to become familiar with research methods and applications for understanding the genome, epigenome, proteome, and protein structure.

BMS mini courses: Approximately 25 to 30 BMS mini courses are provided each spring semester. These courses are formatted as intensive, round-table discussions of current literature in specific topics. Topics of BMS mini courses changes every year. Topics in the past few years included: Introduction to Bioinformatics and Computer Programming for Biologists; Engineering Life: A Flipped Classroom with iBiology, Autoimmunity: cellular and genetic mechanisms and therapeutic targeting, etc.

Visit http://bms.ucsf.edu/courses for more detail on the entire list of BMS core courses, and http://bms.ucsf.edu/academic-program/electives for elective or mini courses.

Quantitative Biosciences (QB3) Program

Courses relevant to FAVOR trainees offered by the QB3 program are available for enrollment. Depending on the FAVOR trainee background and career interests, they may be advised by mentors to take these courses. BMS mini courses are also available each spring semester.

Visit http://qb3.org/ucsf/education/courses for a full list of available courses under the QB3 program.

Training in Clinical Research (TICR) Program

Courses relevant to FAVOR trainees offered by the TICR program are available for enrollment. Depending on the FAVOR trainee background and career interests, they may be advised by mentors to take these courses.

Visit http://ticr.ucsf.edu/courses/schedule/course_descriptions.html for a full list of available courses under the TICR program.

Immunogenetics and Transplantation Laboratory Courses

A core mission of the Immunogenetics and Transplantation Laboratory is providing educational programs that leverage the knowledge and skills of the laboratory faculty and staff and its state-of-the-art resources. Each year the lab offers several short courses to train students, fellows, and healthcare professionals. For a list of courses and contact information visit:

https://itl.ucsf.edu/education.aspx

SEMINARS, WORKSHOPS AND CLUBS

These seminars, workshops and clubs do not count toward the required 100 hours of didactic. Seminars are attended by both trainees and faculty members/mentors.

FAVOR T32 Seminars (no cost) 20 hours

The FAVOR T32 Seminars are designed specifically for the FAVOR T32 trainees, and are taught principally by participating T32 mentors. Topics include the following 2.5-hour sessions:

- Introduction to Human Biomarker Discovery and Validation (Minnie Sarwal). There will be a discussion about the principles of biomarker discovery, validation and cross-validation and the steps to get the biomarker ready for clinical practice
- Introduction to the Omics and Omics Toolbox (Minnie Sarwal, Atul Butte). There will be a discussion of the cutting-edge technologies that allow for genome and proteome wide interrogation for hypothesis generation to understand new mechanisms of transplant injury and dysfunction.
- Transplant Immunology and Tools for Laboratory Assessment (Qizhi Tang). There will be a review of current immune and cellular assays used for human immune monitoring relevant to transplant studies.
- Cellular Therapy (Qizhi Tang). This session will review the state-of-the-art progress of therapeutic application of stem cells and immune regulatory cells in transplantation.
- Introduction to Bioengineering & Device Development (Shuvo Roy). Topics will include an overview of basic bioengineering approaches to life sciences research, mathematical modeling, design and prototypes.
- Interacting with Industry (Flavio Vincenti,). This small group discussion will be held to review experiences in various partnerships with industry and how to leverage support from industry to promote therapeutic development.

Seminar Series

Seminars are attended by both trainees and faculty members/mentors.

1. **Transplant Seminar Series**
   Frequency: Monthly, but varies according to presenter's availability
   Location and Schedule: Contact T32FavorTraining@UCSF.edu for information.

2. **Human Immunology Seminar**
   Frequency: Every second Tuesday of the month
   Location: HSW-1057
   Schedule: Contact T32FavorTraining@UCSF.edu for information.

Journal Clubs (JC)

Journal clubs are attended by both trainees and faculty members/mentors. Several journal clubs are attended by both trainees and faculty members/mentors. They occur monthly in Transplant (part of the weekly Transplant Laboratory meetings); monthly in Gastroenterology; and weekly in Immunology, BMS, and Nephrology.

1. **Immunology Journal Club**
   Frequency: Weekly – Thurs 9-10 am
   Location: Parnassus N-217
   Schedule: http://immunology.ucsf.edu/immunology-journal-club

2. **BMS Journal Club**
   Frequency: Weekly – Thurs 12-1 pm
   Location: Parnassus N-225
   Schedule: https://bms.ucsf.edu/events/bms-journal-club

3. **Nephrology Journal Club/Renal Grand Round**
   Frequency: Selected Wednesdays
   Location: N729
   Schedule: Contact Deborahann.Gilman@ucsf.edu for information.

Series Name	Meeting Frequency	Organizer
Hepatology Fellows Course		Svetlana.Sogolova@ucsf.edu
Nephrology Fellows Courses		Jun.Shoji@ucsf.edu
Renal Pathology Conferences	2nd & 4th Thurs of the month 5-6pm	Kuang-Yu.Jen@ucsf.edu Zoltan.Laszik@ucsf.edu
ITL course elective course		Rajalingam.Raja@ucsf.edu