UC SAN DIEGO PROGRAM FOR CAREER DEVELOPMENT IN GLYCOSCIENCES
NHLBI TRAINING FELLOWSHIPS FOR PHYSICIAN-SCIENTISTS AND POSTDOCTORAL FELLOWS

This document provides a comprehensive overview of the UC San Diego Career Development Program in Glycosciences. The purpose of this program is to train the next generation of biomedical scientists for whom glycans play an integral role in their research. Selected scholars will commit to rigorous training in glycosciences over 2-3 years and carry out a research project involving glycoscience. The UC San Diego Program is coordinated by the UC San Diego Glycobiology Research and Training Center (grtc.ucsd.edu) and is part of a national consortium sponsored through a K12 grant from the National Heart, Lung, and Blood Institute at the National Institutes of Health. The Program includes mentored research, laboratory and didactic coursework, interaction with eminent scientists in the field, and participation in the national consortium. Candidates in the Program will be provided a stipend and opportunities to attend local and national meetings relevant to their work. Consideration will be made for increasing the number of underrepresented scholars.

TO APPLY
Scholars interested in participating in this K12 training program must have the following credentials:

▪ Be a citizen or permanent resident of the USA
▪ Possess an appropriate doctoral degree (MD, MD/PhD, or PhD) in biomedical, chemical, bioengineering or physical sciences
▪ Acceptance by an approved faculty mentor (see Table of Faculty Mentors)
▪ Strong letter of recommendation from Faculty Mentor
▪ For MDs who have not done PhD thesis work, evidence of motivation to pursue basic research and significant past research experience before or during medical school and residency training
▪ Interest and/or experience in one or more aspects of glycoscience
▪ Adequate space and resources provided by the Faculty Mentor (including available funding to support costs not provided by the grant)
▪ Long-term commitment of the Faculty Mentor to the candidate
▪ Commitment of the candidate and Faculty Mentor to participate in the activities of the program throughout the training period

Applicants must first contact an approved faculty mentor (see below) and be accepted into their research program. If the scholar meets the above selection criteria, the mentor and scholar should submit the following materials to GlycoK12@health.ucsd.edu.

APPLICATION PACKAGE (SUBMITTED BY MENTOR AS A SINGLE PDF)
▪ Application Form
▪ Mentor’s statement regarding candidate (1 page)
▪ Candidate’s statement of interest in the program (1 page)
▪ Complete CV of candidate
▪ Recent NIH Biosketch of Mentor
▪ Current “Other Support” of Mentor

More Information: grtc.ucsd.edu or GlycoK12@health.ucsd.edu
### FACULTY MENTORS

Interested scholars should contact individual mentors to discuss the possibility of joining their research group.

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<th>FACULTY MENTOR</th>
<th>DEPARTMENT</th>
<th>RESEARCH INTEREST</th>
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<tr>
<td>Lars Bode</td>
<td>Pediatrics</td>
<td>Human milk oligosaccharides and immunity</td>
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<td>Michael Burkart</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Biosynthesis and glycosylation of natural products</td>
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<td>Andrew Chisholm</td>
<td>Neurobiology</td>
<td>Heparan sulfate and axon guidance</td>
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<td>Adam Engler</td>
<td>Bioengineering</td>
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<td>Jeffrey Esko</td>
<td>Cellular and Molecular Medicine</td>
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<td>Mark Fuster</td>
<td>Medicine</td>
<td>Heparan sulfate and lymphangiogenesis</td>
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<tr>
<td>Pascal Gagneux</td>
<td>Pathology</td>
<td>Glycans in fertilization</td>
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<tr>
<td>Richard Gallo</td>
<td>Dermatology</td>
<td>Hyaluronan and skin immunity</td>
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<td>Kamil Godula</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Glycomaterials and glycomics tool development</td>
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<tr>
<td>Philip Gordts</td>
<td>Medicine</td>
<td>Glycans in lipoprotein metabolism and diabetes</td>
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<tr>
<td>Tracy Handel</td>
<td>Skaggs School of Pharmacy</td>
<td>Heparan sulfate and chemokines</td>
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<tr>
<td>Amanda L. Lewis</td>
<td>OBGYN &amp; Reproductive Sciences</td>
<td>Bacteriology / Women's Health</td>
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<tr>
<td>Nate Lewis</td>
<td>Pediatrics</td>
<td>Glycan bioinformatics and systems biology</td>
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<tr>
<td>Victor Nizet</td>
<td>Pediatrics</td>
<td>Glycans and infectious disease</td>
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<tr>
<td>Bernhard Palsson</td>
<td>Bioengineering</td>
<td>Glycans and systems biology</td>
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<tr>
<td>Gentry Patrick</td>
<td>Neurobiology</td>
<td>Glycans and synaptogenesis</td>
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<tr>
<td>Gulcin Pekkurnaz</td>
<td>Neurobiology</td>
<td>O-GlcNAc and mitochondrial metabolism</td>
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<tr>
<td>Christina Sigurdson</td>
<td>Pathology</td>
<td>Heparan sulfate and prions</td>
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<tr>
<td>Yitzhak Tor</td>
<td>Chemistry and Biochemistry</td>
<td>Guanidinoglycosides and enzyme delivery</td>
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<tr>
<td>Ajit Varki</td>
<td>Medicine / Cellular and Molecular Medicine</td>
<td>Sialic acid biology and evolution</td>
</tr>
<tr>
<td>Alice Yu</td>
<td>Pediatrics</td>
<td>Glycosphingolipid-directed cancer therapy</td>
</tr>
</tbody>
</table>

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PROGRAM ELEMENTS

SCHOLAR APPOINTMENT AND COMPENSATION

Scholars are appointed to the Program on a rolling basis. Salary support is provided based on institutional salary rates, consistent with the level of experience. Additional support for attending symposia, limited conference travel costs, and rotation to other consortium sites may also be available. The Program is designed to provide comprehensive training over a period of 2-3 years. The information below provides an overview of the training program. Each scholar’s progress through the program will be assessed and adjustments made to accommodate any specific needs.

CORE PROGRAM ACTIVITIES

- **Individual Development Plan**
  Each scholar will formalize an Individual Development Plan (IDP) in collaboration with their Faculty Mentors to define their professional/career objective(s). The IDP will be reviewed annually to revise goals as needed and ensure the scholar’s research and education plan are on track.

- **Ongoing Mentored Research Project**
  Under the direction of the Faculty Mentor, the Scholar will work on a research project in the Mentor’s laboratory.

- **Achievement of scientific literacy and competence in glycoscience**
  Scholars will participate in hands-on and didactic course work. Optional courses in career development skills are also provided.

- **Networking and Communication**
  Scholars will have the opportunity to interact with eminent scientists in the field and to exchange information with other scholars through local meetings and national conferences.

YEAR 1 ACTIVITIES

- **Active research in mentor’s laboratory**
- **Introduction to Glycoscience (CHEM 142 / CHEM 242) (Required)**
  The primary aim of Introduction to Glycoscience is to provide an overview of fundamental facts, concepts, and methods in glycoscience.

- **Glycoscience Bootcamp (Required)**
  Glycoscience bootcamp is a two-week summer workshop providing scholars with hands-on training in glycan analytical techniques, balancing the presentation of theory with practical demonstrations and scholar participation.

- **Scientific Ethics and Survival Skills in Academia (COGSCI/NEUROSCI/PATH/SOM 241/ANTHRO271) (Required)**
  Topics include research misconduct, data management, bias and conflicts of interest, animal subjects, human subjects, stem cell research, publication, peer review, collaboration, authorship, mentoring, social responsibility, asking questions, and whistle blowing, writing of papers and proposals, oral communication for educators and scientists, career advancement, and time management.

- **Current Literature in Glycobiology (MED 246 / CMM 246) (Required)**

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Journal Club provides a forum for informal discussion of current papers in glycobiology research.

- **Glycoscience Workshop (Required)**  
  Glycoscience Workshop is a monthly informal meeting for program scholars and their mentors to share information about their projects and various skills related to glycoscience.

- **San Diego Glycobiology Symposium**  
  The San Diego Glycobiology Symposium is an annual conference which brings together researchers throughout California to exchange information about the latest advances in the field. Next Generation Seminar (NextGen) is held the day before the main conference for students, fellows, and postdocs only and provides a mechanism for scholars to discuss their research in a non-intimidating environment. Scholars will participate in the symposium, will present their work during the poster session and may submit an abstract to be considered for a 10-minute presentation during NextGen.

**YEAR 2 ACTIVITIES**

- **Advances in Glycobiology (MED 225 / CHEM 237 / BGGN 236 / CMM 225) (Required)**  
  This course consists of discussions of classic papers leading to modern concepts in glycobiology, with the objective of exploring the structure, metabolism, and function of glycans in biological systems. Students should develop a sense of the history of the field, seminal discoveries, and how these discoveries led to changes in the way scientists think about glycans. Students will make 1-2 presentations in consultation with a faculty member.

- **Current Literature in Glycobiology (MED 246 / CMM 246) (Required)**
- **Glycoscience Workshop (Required)**
- **San Diego Glycobiology Symposium**
- **Career Development or Elective Course (see Optional Elements below)**

**YEAR 3 ACTIVITIES**

- **Case Studies and Clinical Correlations in Glycobiology (MED 221) (Required)**  
  Clinical Correlations provides a venue for scholars to read, critique and present topics in glycoscience related to clinical medicine.

- **Current Literature in Glycobiology (MED 246 / CMM 246) (Required)**
- **Glycoscience Workshop (Required)**
- **San Diego Glycobiology Symposium**
- **Career Development or Elective Course (see Optional Elements below)**

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OPTIONAL ELEMENTS
The following list is not intended to be comprehensive, rather includes elements that may be included in a particular scholar’s curriculum, depending on their level, research needs, and to ensure a well-rounded scientist.

Rotation Program
UC San Diego offers a broad spectrum of training and educational opportunities in glycoscience. However, if specific training needed by a scholar is not available at UC San Diego, a rotation to one of the other consortium sites may be arranged.

Molecular Biology of the Cardiovascular System (MED238 / BE238)
This course is a broad survey of the molecular biology of the cardiovascular system, covering the development of the heart, cardiac conduction system, and vasculature, and the relevance of these to understanding and treating cardiovascular disease.

Pathogens and Host Defense: Immunology (BIOM253)
This course covers nine topics relevant to understanding contemporary immunity, primarily focused on acquired immunity.

Practical Histopathology in Mouse Models of Human Disease: Guides to Phenotyping the Genetically Altered Mouse (MED234 / PATH234 / BGGN234)
The course is designed to guide the analysis of genetically altered mice.

Careers in Biomedical Sciences (PHAR234 / BIOM 234)
Panelists from a diversity of career backgrounds will present a brief synopsis of their personal career path followed by open forum discussion with course attendees. The goal is to expose attendees to career options available to those with biomedical science training.