University of Oklahoma Health Sciences Center

Graduate Program in Biomedical Sciences (GPiBS)
Summer Undergraduate Research Programs (SURP)

Katie Hudson Ph.D., Assistant Director of GPiBS and SURP
My Path

- B.S. in Biology and Chemistry, ECU Ada OK
  - McNair Scholar, undergraduate research
- OUHSC Graduate Program in Biomedical Sciences (GPiBS)
- OUHSC Department of Microbiology and Immunology
  - PH.D.
- OUHSC Department of Ophthalmology
  - Postdoctoral Fellow
- OUHSC Graduate College
  - Assistant Director of GPiBS and SURP
  - Instructor, Department of Cell Biology
My Research

+ McNair Scholar
  + Kerr Lab, EPA Facility
    + “How competition among surrounding woody plants affects individual growth patterns”
  + Ph.D.
    + “Characterization of a Bacillus anthracis serine/threonine kinase”
  + Postdoc
    + “Characterization of Herpes Simplex Virus Type I induced corneal neovascularization in mice and humans”
HSV-1 Induced Corneal Neovascularization

Herpetic stromal keratitis (HSK)

Cold sore

Modified from Dasguptaa and BenMohameda (Vaccine 29 (2011) 5824–5836)
Why do biomedical research?

- Joy of discovery
- Do original work
- Hands on experience
- Every day is unique
  - Variety of experimental techniques, scientific writing (manuscripts/grants), data analysis, research presentations
- A career in biomedical research is always evolving!
Graduate Program in Biomedical Sciences

- Is offered through the OUHSC Graduate College
- GPiBS students spend the first year completing interdisciplinary course work and participate in 3 lab rotations
- After finishing the first year in GPiBS, students select a specific program or department to complete their Ph.D. work
Program Benefits

- Generous stipend
  - $24,000
- Full tuition waiver
- Health insurance benefits
Participating Programs

- Biochemistry and Molecular Biology
- Cell Biology
- Microbiology and Immunology
- Oklahoma Center for Neuroscience
- Pathology
- Pharmaceutical Sciences
- Physiology
Apply and get accepted to GPiBS

Year 1 – classes, journal clubs, seminars, and lab rotations
  Students pick a lab and Ph.D. program at the end of year 1

Year 2 – continue course work specific to Ph.D. program
  Students take the qualifying exam at the end of year 2 and become Ph.D. candidates

Years 3 through 6
  Students complete doctoral research, publish papers, present research at meetings
  Students defend dissertation and receive Ph.D.
GPiBS Program- Year 1

+ **Fall semester**
  + Molecular Systems I and II
  + Cellular Systems I and II
  + Three Journal Club Sessions
  + Scientific Integrity
  + Two laboratory rotations (8 weeks each)

+ **Spring semester**
  + Students choose 12 selective courses specific to the Ph.D. program they want to enter
  + One or two laboratory rotations (8 weeks each)
# GPiBS Selective Spring Courses

## Block 1 (4 weeks)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>MI 6032</td>
<td>Immunology - Part 1</td>
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<tr>
<td>BIOC 6341-005</td>
<td>Metabolic Regulation</td>
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<tr>
<td>BIOC 6321-003</td>
<td>Proteomics</td>
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<tr>
<td>PHYO 6401-001</td>
<td>Genes to Physiology: Integrated Cardiovascular and Renal Systems</td>
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<tr>
<td>MI 5320</td>
<td>Basic Bacteriology</td>
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<tr>
<td>PHSC 5561</td>
<td>General Principles of Pharmacology: The ins and outs of drug action</td>
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<tr>
<td>BIOC 6321-004</td>
<td>Molecular Structure and Graphics in Biomedical Sciences</td>
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<td>PATH 6121</td>
<td>Molecular Mechanisms of Human Disease</td>
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## Block 2 (4 weeks)

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<tr>
<td>PHYO 6301-005</td>
<td>Genes to Physiology: Angiogenesis and Lymphangiogenesis</td>
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<tr>
<td>OCNS 6201</td>
<td>Behavioral Neuroscience</td>
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<tr>
<td>MI 6301</td>
<td>Basic Microbiology</td>
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<tr>
<td>BIOC 6341-004</td>
<td>GTPases as Biological Switches</td>
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<tr>
<td>CELL 6321: OCNS 6321</td>
<td>Molecular and Cellular Aspects of Vision</td>
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<tr>
<td>MI 6032</td>
<td>Immunology – Part 2</td>
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<td>PHSC 5571: OCNS 5571</td>
<td>Neuropharmacology</td>
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<tr>
<td>PHYO 6401-002</td>
<td>Genes to Physiology: Cardiovascular Genomics and Diseases</td>
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<tr>
<td>BIOC 6321-006</td>
<td>Glycobiology</td>
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<tr>
<td>PATH 6301</td>
<td>From Cells to Tissues to Molecular Morphology</td>
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<tr>
<td>OCNS 6311</td>
<td>Neuroimmunology</td>
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## Block 3 (4 weeks)

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<tr>
<td>PHYO 6401-003</td>
<td>Genes to Physiology: Integrative Aspects of Smooth Muscle Function</td>
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<tr>
<td>MI 6111</td>
<td>Immunity and Disease</td>
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<tr>
<td>BIOC 6341</td>
<td>Transcription Regulation, Control of Development</td>
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<tr>
<td>MI 6501</td>
<td>Molecular Micro</td>
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<tr>
<td>PHYO 6401-004</td>
<td>Genes to Physiology: Cellular and Physiological Aspects of Aging</td>
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<tr>
<td>CELL 6331</td>
<td>Molecular Genetics</td>
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<tr>
<td>BIOC 6321-005</td>
<td>Molecular Virology</td>
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<tr>
<td>PHSC 5581</td>
<td>General and Systemic Toxicology: The study of poisons</td>
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<tr>
<td>OCNS 6101</td>
<td>Neurobiology</td>
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Recommended Undergraduate Courses

- Biochemistry
- Organic chemistry
- Upper division biology (one or more of the following)
  - Cell biology
  - Molecular biology
  - Microbiology
  - Physiology
- Calculus
- Physics
Admissions

- Complete OUHSC online application
  - [https://app.applyyourself.com/AYApplicantLogin/fl_ApplicantLogin.asp?id=uok-hs](https://app.applyyourself.com/AYApplicantLogin/fl_ApplicantLogin.asp?id=uok-hs)

- Send supplemental materials to GPiBS office via email or courier
  - Melissa-Pinkston@ouhsc.edu
  - 940 Stanton L Young, BMSB-Room 332, Oklahoma City, OK 7126-0901

- Supplemental materials
  - Printed OUHSC online application
  - Official transcripts
  - Three letters of recommendation
  - Goals/Purpose Statement
  - GRE scores
  - International students also need to send TOEFL Scores and WES review
Personal Statement

- What are your qualifications?
- What research experiences have you participated in and what did you do?
- What sets you apart?
- How do you know that a doctoral program fits with your future career/educational plans?
Letters of Recommendation

+ Is the referee qualified to judge the student’s ability to become a scientist?

+ Include specifics unique to the student.

+ Description of research experience and the student’s contribution to a given study.
Summer Undergraduate Research Programs

- OUHSC offers four programs for undergraduate students to do research on our campus
  - **SURE Program** (Summer Undergraduate Research Experience)
    - $3,000 stipend, housing, and tuition waiver
    - 12 students each year
  - **NARCH** (Native American Research Center for Health)
    - $3,500 stipend, housing, and tuition waiver
    - 6 students each year
  - **INBRE Summer Research Program** (Idea Network Biomedical Research Excellence)
    - $5,000 stipend, tuition and fees for 3 credit hours
    - 24 students each year
  - **Summer Research Scholars Program** (Stephenson Cancer Center)
    - $3,000 stipend, $400 tuition waiver
    - 10 students each year
## GPiBS Admissions Statistics

<table>
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<tr>
<th>Year</th>
<th>Verbal</th>
<th>Quant</th>
<th>A/W</th>
<th>Average GPA</th>
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<tbody>
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<td>62%</td>
<td>64%</td>
<td>38%</td>
<td>3.6</td>
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<tr>
<td>2010</td>
<td>61%</td>
<td>73%</td>
<td>40%</td>
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<tr>
<td>2011</td>
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<td>76%</td>
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<tr>
<td>2012</td>
<td>75%</td>
<td>68%</td>
<td>45%</td>
<td>3.68</td>
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<tr>
<td>2013</td>
<td>61%</td>
<td>63%</td>
<td>38%</td>
<td>3.61</td>
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<tr>
<td>Average</td>
<td>65%</td>
<td>68%</td>
<td>42%</td>
<td>3.63</td>
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## GPiBS Admissions Statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>Applied</th>
<th>Accepted</th>
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<td>2009</td>
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<td>2010</td>
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<tr>
<td>2013</td>
<td>78</td>
<td>14</td>
<td>25</td>
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</table>
Research topics at OUHSC

- Podoplanin maintains high endothelial venule integrity by interacting with platelet CLEC-2
  - Nature, Brett Herzog, Department of Biochemistry and Molecular Biology

- Clostridium difficile 027/BI/NAP1 encodes a hypertoxic and antigenically variable form of TcdB
  - Plos Pathogens, Jordi Lanis, Department of Microbiology and Immunology

- Effect of reduced retinal VLC-PUFA on rod and cone photoreceptors
  - IOVS, Lea Bennett, Department of Cell Biology
Postdoctoral Career Options

+ **Research**
  + Academic institute
    + OUHSC
  + Government institute
    + NIH, CDC, USDA, FBI
  + Industry
    + Genentech

+ **Teaching**
  + OU Norman, UCO

+ **Science Policy**
  + NIH, scientific societies

+ **Marketing**
  + Sales rep, technical support

+ **Patent Attorney**
  + Dunlap and Codding

+ **Business of Science**
  + Venture capitalist, market researcher

+ **Public Health**
  + CDC, State Department

+ **Science Writing**
  + Nature reviews
Contact Information

Director, GPiBS
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http://www.oumedicine.com/gpibs