T Team Agenda

• Welcome & Introductions
  Thomas A. Pearson, MD, PhD, MPH

PRE-AWARD
• T32 Status Updates
  Wayne McCormack, PhD
• T32 Applications – Data Tables
  Audrey Dickinson & Wayne McCormack, PhD
• Trainee Pipeline & NIH Support
  Wayne McCormack, PhD
• Undergraduate Research Programs
  David Julian, PhD
• Trainee Diversity
  Talline Martins, PhD
• Training Elements
  Wayne McCormack, PhD
  • Team Training
  • Rigor & Reproducibility
  • Research Skills (Competencies)
  • Career & Professional Development

POST-AWARD
• Post-Award Administration Advice
  Ronda Breton, UF College of Dentistry
• Training Program Web Pages
  Audrey Dickinson & Wayne McCormack, PhD
• NIH Site Visits
  Lyle Moldawer, PhD
Welcome & Introductions

• Thomas A. Pearson, MD, PhD, MPH
T32 Status Updates

• Updated training grant list
T32 Applications – Notes about Data Tables

• Table 1
• Table 2
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• Table 8
### Table 1. Census of Participating Departments and Interdepartmental Programs

#### Part I. Predoctorates

<table>
<thead>
<tr>
<th>Participating Department or Program</th>
<th>Total Faculty</th>
<th>Participating Faculty</th>
<th>Total Predoctorates</th>
<th>Total Predoctorates Supported by any HHS Training Award</th>
<th>Total Predoctorates with Participating Faculty</th>
<th>Eligible Predoctorates with Participating Faculty</th>
<th>TGE Predoctorates Supported by this Training Grant (Renewals/Revisions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising</td>
<td>11</td>
<td>1</td>
<td>17</td>
<td>0</td>
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<td>Anthropology</td>
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<td>90</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
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<td>Biochemistry &amp; Molecular Biology</td>
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<td>20</td>
<td>3</td>
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<td>Biomedical Engineering</td>
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<td>100</td>
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<td>67</td>
<td>7</td>
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<td>Epidemiology</td>
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<td>24</td>
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<td>10</td>
<td>6</td>
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<td>Food Science &amp; Human Nutrition</td>
<td>26</td>
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<td>4</td>
<td>4</td>
<td>0</td>
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<tr>
<td>Health Education &amp; Behavior</td>
<td>8</td>
<td>1</td>
<td>15</td>
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<td>2</td>
<td>2</td>
<td>0</td>
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<tr>
<td>Health Outcomes &amp; Biomedical Informatics</td>
<td>13</td>
<td>2</td>
<td>12</td>
<td>0</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Infectious Diseases &amp; Immunology</td>
<td>20</td>
<td>4</td>
<td>16</td>
<td>1</td>
<td>7</td>
<td>6</td>
<td>1</td>
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<tr>
<td>Mechanical &amp; Aerospace Engineering</td>
<td>52</td>
<td>2</td>
<td>218</td>
<td>2</td>
<td>12</td>
<td>9</td>
<td>0</td>
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<tr>
<td>Medicinal Chemistry</td>
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<td>21</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
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<tr>
<td>Medicine</td>
<td>65</td>
<td>2</td>
<td>12</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

**Table 1**

Listed by department, not by graduate program

Trainees must not be counted more than once
Table 2

Need “Research Interest” descriptions to be short and sweet

These average 11 words

Some have been 30+

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Rank</th>
<th>Primary Department or Program</th>
<th>Research Interest</th>
<th>Training Role</th>
<th>Pre-doctorates in Training</th>
<th>Pre-doctorates Graduated</th>
<th>Pre-doctorates Continued in Research or Related Careers</th>
<th>Post-doctorates in Training</th>
<th>Post-doctorates Completed Training</th>
<th>Post-doctorates Continued in Research or Related Careers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argander. Mavis</td>
<td>PhD</td>
<td>Prof &amp; Center Dir</td>
<td>Biochemistry &amp; Molecular Biology</td>
<td>Structural studies of ssDNA viruses, Paroviridae, Gemmiviridae, Microviridae, and Circoviridae</td>
<td>Preceptor</td>
<td>3</td>
<td>10</td>
<td>9</td>
<td>2</td>
<td>8</td>
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</tr>
<tr>
<td>Aldrich, Jane</td>
<td>PhD</td>
<td>Prof</td>
<td>Medicinal Chemistry</td>
<td>Peptide medicinal chemistry, opioid peptides, anticancer peptides</td>
<td>Preceptor</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Angelin, Thomas</td>
<td>PhD</td>
<td>Assoc Prof</td>
<td>Mechanical &amp; Aerospace Engineering</td>
<td>Biomolecular self-assembly, mechanical instabilities in tissue cell assemblies, bacterial biofilm physics</td>
<td>Preceptor</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Ash, John</td>
<td>PhD</td>
<td>Assoc Prof</td>
<td>Ophthalmology</td>
<td>Retinal degeneration</td>
<td>Preceptor</td>
<td>5</td>
<td>4</td>
<td>4</td>
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<td>0</td>
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<tr>
<td>Atkinson, Mark A.</td>
<td>PhD</td>
<td>Eminent Scholar &amp; Inst Dir</td>
<td>Pathology, Immunology &amp; Laboratory Medicine</td>
<td>Role of environment in initiation of Type 1 diabetes, stem cells, pancreas regeneration, markers of tolerance and immune-regulation, gene therapy</td>
<td>Preceptor</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Avram, Costa</td>
<td>PhD</td>
<td>Prof</td>
<td>Medicine (Pulmonary, Critical Care, &amp; Sleep Medicine)</td>
<td>Altered regulatory mechanisms of the immune system in autoimmune diseases &amp; asthma</td>
<td>Preceptor</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Bloom, David C.</td>
<td>PhD</td>
<td>Prof</td>
<td>Molecular Genetics &amp; Microbiology</td>
<td>Regulation of Herpes simplex virus latency &amp; reactivation; novel therapies to treat HSV recurrent disease</td>
<td>Preceptor</td>
<td>2</td>
<td>8</td>
<td>7</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 4

Current Year Direct Cost is divided by number of MPI K award amounts are not counted twice if both Scholar and Mentor are listed
### Table 6A

**Applicants, Entrants, and their Characteristics for the Past Five Years: Predoctoral**

#### Part I. Counts

<table>
<thead>
<tr>
<th>Most Recently Completed Year: 2016-2017 Current TL1 Funding Period</th>
<th>Total Applicant Pool</th>
<th>Applicants Eligible for Support</th>
<th>New Entrants to the Program</th>
<th>New Entrants Eligible for Support</th>
<th>New Entrants Appointed to this Grant (Renewal/Revision Applications Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical Sciences PhD Program</td>
<td>229</td>
<td>125</td>
<td>38</td>
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<tr>
<td>Biomedical Engineering PhD Program</td>
<td>128</td>
<td>75</td>
<td>11</td>
<td>11</td>
<td>-</td>
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<tr>
<td>Clinical &amp; Health Psychology PhD Program</td>
<td>235</td>
<td>219</td>
<td>11</td>
<td>10</td>
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<tr>
<td>Epidemiology PhD Program</td>
<td>25</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>-</td>
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<tr>
<td>Food Sci &amp; Human Nutrition PhD Program</td>
<td>55</td>
<td>15</td>
<td>6</td>
<td>4</td>
<td>-</td>
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<tr>
<td>Health &amp; Human Performance PhD Program</td>
<td>81</td>
<td>28</td>
<td>18</td>
<td>8</td>
<td>-</td>
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<tr>
<td>Health Outcomes &amp; Policy PhD Program</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>-</td>
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<tr>
<td>Mass Communication PhD Program</td>
<td>47</td>
<td>16</td>
<td>10</td>
<td>7</td>
<td>-</td>
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<tr>
<td>MD-PhD Program</td>
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<td>143</td>
<td>7</td>
<td>7</td>
<td>3</td>
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<tr>
<td>Nursing Sciences PhD Program</td>
<td>18</td>
<td>10</td>
<td>7</td>
<td>2</td>
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<tr>
<td>Pharmaceutical Sciences PhD Program</td>
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<td>19</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Rehabilitation Science PhD Program</td>
<td>29</td>
<td>14</td>
<td>10</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Veterinary Medical Sciences PhD Program</td>
<td>17</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1217</strong></td>
<td><strong>706</strong></td>
<td><strong>149</strong></td>
<td><strong>91</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

**Table 6A**

Predoc data reported by Graduate Program, not by Department
Table 8A. Program Outcomes: Predoctoral

Part I. Those Appointed to the Training Grant

<table>
<thead>
<tr>
<th>Trainee</th>
<th>Faculty Member</th>
<th>Start Date</th>
<th>Summary of Support During Training</th>
<th>Terminal Degree(s) Received and Year(s)</th>
<th>Topic of Research Project</th>
<th>Initial Position Department Institution Activity</th>
<th>Current Position Department Institution Activity</th>
<th>Subsequent Grant(s) Role/Year Awarded</th>
</tr>
</thead>
</table>

Research Intensive vs. Research Related

Encourage mentors to contact former trainees for subsequent grants.
Trainee Pipeline & NIH Support

NIGMS Administered Training Programs

Pre-Kindergarten – High School

Science Education Partnership Awards (SEPA)

Undergraduate | Post-bacc | Graduate MS | Graduate PhD | Postdoctoral

RISE

BRIDGES to BACC

PREP

BRIDGES to DOC

IRACDA

NRSA Fellowships

IMSD

Diversity Supplement Program

T32 NRSA

K Awards

Alison Gammie
TWD PD Meeting
June 2017
Undergraduate Research Programs

• David Julian, PhD
Trainee Diversity

• Talline Martins, PhD
Team Training Model

• Using TL1 Teams To Transform Clinical & Translational Science Training

If We Expect Future Scientists To Work in Teams, They Should Be Trained in Teams

“TL1 Teams”

Supported by UF CTSA Awards TL1TR001428 and UL1TR001427
Levels of Clinical & Translational Science (CTS) Engagement for UF PhD & Dual Degree Students

**TL1 Training Grant**
- CTS Co-Major
- TL1 Team
- Publish
- ACTS Conference

**CTS PhD Co-Major**
- CTS Core (8)
- Electives (6)
- Clin/Trans PhD Aim
- CTSI Research Day

**CTS Graduate Certificate**
- CTS Core Curriculum (8 credits)
- Electives (3 credits)
CTS PhD Curriculum

Year 1

- **Translational Research & Therapeutics: Bench, Bedside, Community, & Policy** (3)
- **Team Science** (1)
- Responsible Conduct of Biomedical Research (1)

Year 2

- CTS Journal Club (1)
- CTS Seminar (2)

Electives (6)

- Experimental Design
- Quantitative Skills
- Professional Development
Translational Research & Therapeutics: Bench, Bedside, Community, & Policy (GMS 6847)

- Interdisciplinary teams identify unmet health need of common interest
- T Phases
  - Lectures, readings
  - Immediate application by Team-Based Learning (TBL)
  - Apply to unmet health need
  - Team reports
- Final report
Team Science (GMS 6945)

• Intro to Team Science
• Preparing for Team Science
• Team Leadership
• Building a Research Team
• Writing a Collaboration Plan
• Managing Research Teams
• Conflict Management
• Team Monitoring
• Team Evaluation
Team Science (GMS 6945)

• Intro to Team Science
• Preparing for Team Science
• Team Leadership
• Building a Research Team
• Writing a Collaboration Plan
• Managing Research Teams
• Conflict Management
• Team Monitoring
• Team Evaluation

Behavioral Self-Assessment (DISC)
Vision/Mission/Values
Needs Assessment
Collaboration Plan
Team Dimensional Training
Team Evaluation
TL1 Teams

- Team members
  - Must be from different PhD programs, in different colleges
    - Must apply before defending dissertation proposal

- TL1 Co-Mentors

- Extent of TL1 Team collaboration
  - Team specific aim(s)
    - Overcome a barrier to progress or expand scope of inquiry
    - Level of interdependence
    - Synergy between individual projects
    - Impact on individual dissertation research projects
## 2017 TL1 Teams

<table>
<thead>
<tr>
<th>Team</th>
<th>PhD Majors</th>
<th>Team Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mechanical Engineering</td>
<td>Detection of Metastases in Osteosarcoma Patients Using Microfluidic Devices</td>
</tr>
<tr>
<td></td>
<td>Cancer Biology</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Genetics &amp; Genomics</td>
<td>Associations Between Genetic and Social Factors Affecting Blood Pressure in African-Americans</td>
</tr>
<tr>
<td></td>
<td>Biological Anthropology</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Neuroscience</td>
<td>Translating Reward into Action: Mechanisms Underlying Motivational Disturbances in Parkinson's Disease</td>
</tr>
<tr>
<td></td>
<td>Clinical &amp; Health Psychology</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mechanical Engineering</td>
<td>Transdifferentiation Therapy of 3D Glioblastoma Tumor Models</td>
</tr>
<tr>
<td></td>
<td>Molecular Cell Biology</td>
<td></td>
</tr>
</tbody>
</table>
Rigor & Reproducibility
The Growing Challenge

- Noted by research community; in multiple publications
  - Across research areas
  - Especially in preclinical research

From “Sharing, Reproducibility, Replication – An NIH View”, presented at ACS National Meeting, March 24, 2015 by Philip E. Bourne, PhD, Associate Director for Data Science, NIH
“Reproducibility” is a problem

Science has lost its way, at a big cost to humanity

Researchers are rewarded for splashy findings, not for double-checking accuracy. So many scientists looking for cures to diseases have been building on ideas that aren’t even true.

October 27, 2013 | Michael Hiltzik
Challenges to Ensuring Rigor and Transparency in Reporting Science: Underlying Issues

- Publish or perish!
- Grant support
- Impact factor
- Innovation
- Significance
- Poor training
- Novelty: No negative data

From “Sharing, Reproducibility, Replication – An NIH View”, presented at ACS National Meeting, March 24, 2015 by Philip E. Bourne, PhD, Associate Director for Data Science, NIH
The research incentive structure is sometimes in conflict with training - trainees vs. workforce?
NIH plans to enhance reproducibility

Francis S. Collins and Lawrence A. Tabak discuss initiatives that the US National Institutes of Health is exploring to restore the self-correcting nature of preclinical research.

A growing chorus of concern, from scientists and laypeople, contends that the complex system for ensuring the reproducibility of biomedical research is failing and is in need of restructuring. As leaders of the US National Institutes of Health (NIH), we share this concern and here explore some of the significant interventions that we are planning.

Science has long been regarded as ‘self-correcting’, given that it is founded on the replication of prior work. Over the long term, that principle remains true. In the shorter term, however, scientists have been hobbled by the ability of today’s technology to challenge others’ findings.

Let’s be clear: unless we have evidence of sufficient reproducibility, science is about to lose its integrity. In 2011, the Office of the US Department of Health Services pursued a change in this unhealthy environment.

“Efforts by the NIH alone will not be sufficient to effect real change in this unhealthy environment.”
Solution:

NIH plans to enhance reproducibility

Francis S. Collins and Lawrence A. Tabak discuss initiatives that the US National Institutes of Health is exploring to restore the self-correcting nature of preclinical research.

**WHAT ARE THE UPDATES?**

**1. UPDATES TO RESEARCH STRATEGY GUIDANCE**

The research strategy is where you discuss the significance, innovation, and approach of your research plan. Let's look at an R01, for example:

The new research strategy guidelines require that you:
- State the strengths and weaknesses of published research or preliminary data crucial to the support of your application
- Describe how your experimental design and methods will achieve robust and unbiased results
- Explain how biological variables, such as sex, are factored into research design and provide justification if only one sex is used

**2. NEW ATTACHMENT FOR AUTHENTICATION OF KEY BIOLOGICAL AND/OR CHEMICAL RESOURCES**

From now on, you must briefly describe methods to ensure the identity and validity of key biological and/or chemical resources used in the proposed studies.

These include, but are not limited to:
- **Cell Lines**
- **Antibodies**
- **Specialty Chemicals**
- **Other Biologics**

Standard laboratory reagents that are not expected to vary do not need to be included in the plan. Examples are buffers and other common biologicals or chemicals.

**3. NEW REVIEWER GUIDELINES**

Here are the additional criteria the reviewers will be asked to use:

- **Is there a strong scientific premise for the project?**
- **Have the investigators presented adequate plans to address relevant biological variables, such as sex, for studies in vertebrate animals or human subjects?**
- **Have the investigators presented strategies to ensure a robust and unbiased approach, as appropriate for the work proposed?**

Reviewers will also be asked to comment on that new attachment (see Update 2).
Advanced Notice of Coming Requirements for Formal Instruction in Rigorous Experimental Design and Transparency to Enhance Reproducibility: NIH and AHRQ Institutional Training Grants, Institutional Career Development Awards, and Individual Fellowships

Notice Number: NOT-OD-16-034

Key Dates
Release Date: December 17, 2015

Related Announcements
NOT-OD-16-081
NOT-OD-16-058
NOT-OD-15-102
NOT-OD-15-103
NOT-OD-16-004
NOT-OD-16-011
NOT-OD-16-012

Issued by
National Institutes of Health (NIH)
Agency for Healthcare Research and Quality (AHRQ)

Purpose
This Notice informs the biomedical and health services research communities of NIH and AHRQ plans to require formal instruction in scientific rigor and transparency to enhance reproducibility for all individuals supported by institutional training grants, institutional career development awards, or individual fellowships. Implementation of these requirements will be as early as FY 2017 but will not be in 2016 as indicated in NOT-OD-16-004. An extension of the anticipated implementation date is to ensure that applicants for NIH or AHRQ institutional training grants, institutional career development awards, and individual fellowships have time to access resources and develop substantive instructional plans to ensure that all supported individuals receive in-depth training in rigorous experimental design and data interpretation. NIH and AHRQ will issue a Notice at a future date to provide an updated timeline for implementing this requirement.
NIH Rigor and Reproducibility Training Modules

- Video modules with accompanying discussion materials
- Focus on integral components of reproducibility and rigor in the research endeavor, *e.g.*, bias, blinding, and exclusion criteria

- Also: Online course “Pragmatic and Group Randomized Trials in Public Health and Medicine” by the NIH Office of Disease Prevention
  - Detailed guide to designing and analyzing group-randomized trials
  - Includes video presentations, slide sets, suggested reading materials, and guided activities

https://www.nih.gov/research-training/rigor-reproducibility/training
New NIGMS Institutional Predoctoral Training Grant Funding Opportunity Announcement

Posted by Dr. Alison Gamme, Dr. Kenneth Gibbs and Dr. Shiva Singh on October 19, 2017

We've just released a new training funding opportunity announcement (FOA) specifically tailored for predoctoral graduate programs in the basic biomedical sciences. Through this FOA, we intend to encourage changes in biomedical graduate training that allow it to keep pace with the rapid evolution of the research enterprise, which is increasingly complex, quantitative, interdisciplinary, and collaborative.

The overarching objective of this new predoctoral T32 training program is to develop a diverse pool of well-trained scientists who have the following:

- A broad understanding across biomedical disciplines, and the skills to independently acquire the knowledge needed to advance their chosen field.
- The ability to think critically, independently, and to identify important biomedical research questions and approaches that push forward the boundaries of their areas of study.
- A strong foundation in scientific reasoning, rigorous research design, experimental methods, quantitative and computational approaches, as well as data analysis and interpretation.
- A commitment to approaching and conducting biomedical research responsibly and with integrity.
- Experience initiating, conducting, interpreting, and presenting rigorous and reproducible biomedical research with increasing self-direction.
- The ability to work effectively in teams with colleagues from a variety of cultural and scientific backgrounds, and to promote inclusive and supportive scientific research environments.

Plan for Instruction in Methods for Enhancing Reproducibility (max 3 pages)

- Describe how trainees will be instructed in principles important for enhancing research reproducibility
  - scientific premise
  - rigorous experimental design and data interpretation
  - relevant biological variables
  - authentication of key biological and/or chemical resources
  - data and material sharing
  - record keeping
  - transparency in reporting

- Describe how instruction strategies are:
  - well integrated into the overall curriculum
  - taught at multiple stages of trainee development in a variety of formats and contexts

- Describe how all program faculty will reiterate and augment key elements of methods for enhancing reproducibility when trainees are performing research in their laboratories
UF Plan for Instruction in Methods for Enhancing Reproducibility (max 3 pages)

- Describe how trainees will be instructed in principles important for enhancing research reproducibility
  - scientific premise
  - rigorous experimental design and data interpretation
  - relevant biological variables
  - authentication of key biological and/or chemical resources
  - data and material sharing
  - record keeping
  - transparency in reporting
- Describe how instruction strategies are:
  - well integrated into the overall curriculum
  - taught at multiple stages of trainee development in a variety of formats and contexts
- Describe how all program faculty will reiterate and augment key elements of methods for enhancing reproducibility when trainees are performing research in their laboratories
Rigor & Reproducibility

NEW GRADUATE COURSE:
“Ensuring Rigor and Reproducibility in Clinical and Translational Research”

• 1 credit, online, synchronous
• Being piloted in Summer 2018
• Matthew J. Gurka, PhD, Professor and François Modave, PhD, Associate Professor, Health Outcomes & Biomedical Informatics, College of Medicine
• Principles and best practices required to conduct rigorous and reproducible research across the translational spectrum; sound study planning and design, consideration of all relevant biomedical variables, sound data management practices, statistical considerations and techniques, and transparency in reporting research results
Research Skills (Competencies)
Career & Professional Development
New NIGMS Institutional Predoctoral Training Grant Funding Opportunity Announcement

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- A commitment to approaching and conducting biomedical research responsibly and with integrity.
- Experience initiating, conducting, interpreting, and presenting rigorous and reproducible biomedical research with increasing self-direction.
- The ability to work effectively in teams with colleagues from a variety of cultural and scientific backgrounds, and to promote inclusive and supportive scientific research environments.
Looking Ahead: Predoctoral T32 NIGMS is committed to supporting predoctoral training

Why is this important?
The other institutes are watching the NIGMS pilot program!

Data: FY15 QVR/FTK Predoctoral T32, Parent F31 (PA-11-111, 14-147), Diversity F31 (PA-11-112, 14-148); Kenny Gibbs

TWD PD Meeting June 2017
Gathering Information

Catalyzing the Modernization of Graduate Education

A major overhaul of how we educate graduate students in biomedical research is long overdue.

From “Overview of NIGMS Training and Diversity Program” presented by Allison Gammie at the NIGMS Training, Workforce Development and Diversity Program Directors Meeting, June 2017
NEW NIGMS-specific funding announcement

• Emphasize trainee development.
• Focus on skills development, rigor & reproducibility, diversity & inclusion, and responsible conduct.
• Address conflicts in the incentive structure of the research enterprise.
• Encourage the use of evidence-based, innovative educational practices.
• Require the collection and dissemination of data on the success/failure of educational interventions.
• Emphasize improvements in career preparation (broadly defined) and dissemination of career outcomes on publicly available sites.

From “Overview of NIGMS Training and Diversity Program” presented by Allison Gammie at the NIGMS Training, Workforce Development and Diversity Program Directors Meeting, June 2017
Program Objective Change

The Objective of the Institutional Research Training Grant Program is to:

- **OLD**: develop and/or enhance research training opportunities for individuals interested in careers in biomedical, behavioral and clinical research that are relevant to the NIH mission. The training program should provide… (a set of experiences)

- **NEW**: develop a diverse pool of ethical, well-trained, rigorous scientists who have ….. (a set of skills, described in the next slides)

From “Overview of NIGMS Training and Diversity Program” presented by Allison Gammie at the NIGMS Training, Workforce Development and Diversity Program Directors Meeting, June 2017
Proposed *Trainee* Focused Objectives: Technical/Operational Skills

- Broad understanding across biomedical disciplines, and the skills to independently acquire the knowledge needed to advance their chosen field
- The ability to think critically, independently and to identify important biomedical research questions and approaches that push forward the boundaries of their area of study

From “Overview of NIGMS Training and Diversity Program” presented by Allison Gammie at the NIGMS Training, Workforce Development and Diversity Program Directors Meeting, June 2017
Proposed *Trainee* Focused Objectives: Technical/Operational Skills

- A strong foundation in rigorous research design, experimental methods, quantitative literacy & reasoning skills, data analysis & interpretation
- Experience initiating, conducting, interpreting, and presenting rigorous and reproducible biomedical research with increasing self-direction
Proposed *Trainee* Focused Objectives: Professional Skills

- The ability to work effectively in teams with colleagues from diverse cultural and disciplinary backgrounds, and to promote an inclusive and supportive scientific research environment
- The skills and opportunities to communicate scientific research methodology and findings to a wide variety of audiences (e.g., discipline-specific, across disciplines, and the public)
- The knowledge, professional skills and experiences required to identify and transition into productive careers in the biomedical research workforce
Grad Student & Postdoc Career and Professional Development (GradDev)
Sponsored by the UF CTSI & UF Health

Professional Skills

Doctoral research training focuses on the scientific method of hypothesis-based research and technical skills, but usually does not include training on other professional skills (referred to by some as “soft skills”) that are just as important to potential employers. A recent Council of Graduate Schools survey revealed that employers believe graduate degree holders often lack skills related to working in a team environment, creating and delivering presentations, business acumen (skills necessary to deliver outcomes on schedule and on budget), project management, and the ability to discuss technical issues with nontechnical individuals.” (Council of Graduate Schools and Educational Testing Service. 2012. Pathways Through Graduate School and Into Careers. Report from the Commission on Pathways Through Graduate School and Into Careers. Princeton, NJ: Educational Testing Service.)

These professional skills will be important for your job success and satisfaction no matter which career pathway you choose to follow. They can be learned and improved upon with practice, but are often left to be learned only after one assumes a managerial position. Rather than waiting until you are “on the job” and need to use these skills, it may be to your advantage to become familiar with these professional skills before you enter the workplace. We have organized these along four themes: Research Management, Communication, Leadership, and Teaching.

Tagged as: graduate student, postdoc, professional development
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sample Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Communication</td>
<td>Effective Listening Skills</td>
</tr>
<tr>
<td>2 Mentoring</td>
<td>Mentoring &amp; Being Mentored</td>
</tr>
<tr>
<td>3 Res Management</td>
<td>Getting Funded</td>
</tr>
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<td>4 Leadership</td>
<td>Laboratory Leadership in Science</td>
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<td>5 Collaboration</td>
<td>Introduction to the Science of Team Science</td>
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<tr>
<td>6 Teaching</td>
<td>How to Make Lectures More Effective</td>
</tr>
<tr>
<td>7 Communication</td>
<td>Effective Science Communication in the Internet Age</td>
</tr>
<tr>
<td>8 Mentoring</td>
<td>Diversity and Bias in Mentoring</td>
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<tr>
<td>9 Res Management</td>
<td>Staffing Your Laboratory</td>
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<tr>
<td>10 Leadership</td>
<td>Embracing and Leading Change</td>
</tr>
<tr>
<td>11 Collaboration</td>
<td>Building a Research Team - Who and Why</td>
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<tr>
<td>12 Teaching</td>
<td>University Structure &amp; Planning for T&amp;P</td>
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<tr>
<td>13 Communication</td>
<td>Communicating with a Lay Audience</td>
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<tr>
<td>14 Mentoring</td>
<td>Intro to Mentoring and Giving Feedback</td>
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<td>15 Res Management</td>
<td>Time &amp; Project Management</td>
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<td>16 Leadership</td>
<td>Team Dynamics and Leading Teams</td>
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<td>17 Collaboration</td>
<td>Writing a Collaboration Plan</td>
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<td>18 Teaching</td>
<td>The ABC’s of Grading</td>
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<td>19 Communication</td>
<td>Communication and Conflict Management</td>
</tr>
<tr>
<td>20 Mentoring</td>
<td>Coaching vs. Mentoring</td>
</tr>
<tr>
<td>21 Res Management</td>
<td>IP – Where Science Meets Business</td>
</tr>
<tr>
<td>22 Leadership</td>
<td>Understanding Behavioral Styles &amp; Leadership</td>
</tr>
<tr>
<td>23 Collaboration</td>
<td>Best Practices to Enhance Team Effectiveness</td>
</tr>
<tr>
<td>24 Teaching</td>
<td>Teaching as Scholarship</td>
</tr>
</tbody>
</table>
### Science PhD Core Competencies

1. **Broad Conceptual Knowledge of a Scientific Discipline**
2. **Deep Knowledge of a Specific Field**
3. **Critical Thinking Skills**
4. **Experimental Skills**
5. **Computational Skills**
6. **Collaboration and Team Science Skills**
7. **Responsible Conduct of Research and Ethics**
8. **Communication Skills**
9. **Leadership Skills**
10. **Survival Skills**

## Competency-Based Assessment

<table>
<thead>
<tr>
<th>Dreyfus &amp; Dreyfus Levels of Skill Acquisition</th>
<th>Novice</th>
<th>Advanced Beginner</th>
<th>Competent</th>
<th>Proficient</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule-based behavior, limited, inflexible</td>
<td>Incorporates aspects of the situation</td>
<td>Acts consciously from long-term goals and plans</td>
<td>Sees situation as a whole and acts from personal conviction</td>
<td>Has intuitive understanding of situations, zooms in on central aspects</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training Stages</th>
<th>Beginning PhD Student</th>
<th>Advanced PhD Student</th>
<th>PhD Graduate</th>
<th>Early Career Scientist or Postdoctoral Trainee</th>
<th>Science Professional</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Example</th>
<th>MILESTONES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking Skills: Design a single experiment (answer questions, controls, etc.)</td>
<td>Follow experimental protocols, seek help as needed, describe critical role of controls</td>
</tr>
<tr>
<td></td>
<td>Plan experimental protocol; include relevant controls; choose appropriate methods; troubleshoot experimental problems</td>
</tr>
<tr>
<td></td>
<td>Design and execute hypothesis-based experiments independently; evaluate protocols of others; predict range of experimental outcomes</td>
</tr>
<tr>
<td></td>
<td>Consistently design and execute experiments with appropriate controls; assess next steps; critique experiments of others</td>
</tr>
<tr>
<td></td>
<td>Teach experimental design; guide others doing experiments</td>
</tr>
</tbody>
</table>

Review Criteria: Overall Impact

**Overall Impact:** Reviewers will provide an overall impact score to reflect their assessment of the likelihood that the proposed training program...

**OLD**

…will prepare individuals for successful, productive scientific research careers and thereby exert a sustained influence on the research field(s) involved.

**NEW**

…through courses, structured training activities, and mentored research experiences will produce well-trained, ethical, rigorous and diverse scientists with the **technical, operational, and professional skills** necessary to transition into productive biomedical research **careers**.
Review Criteria - Training Program and Environment

Questions focused on:

OLD

• Research Environment
• Training Program Plan
• Institutional Committee Commitment Sufficient
• Distinct from other funded programs

NEW – additional questions concerning

• Mission, Objectives, and Overall Training Plan
  o Should state measurable, obtainable objectives
  ✔ Institutional and Departmental Commitment
  ✔ Enhancements to the Training Environment
  o Evidence-based approaches to teaching, mentoring and inclusion
  ✔ Mentor Selection Process and Mentor Training
  ✔ Career Development
  ✔ Program Evaluation Plan Aligned with Objectives

From “Overview of NIGMS Training and Diversity Program” presented by Allison Gammie at the NIGMS Training, Workforce Development and Diversity Program Directors Meeting, June 2017
Career Interest Teams

Career Interest Teams are being developed to provide broad-based introductory experiences for UF Health PhD students and postdocs to become familiar with possible career options in the biomedical sciences. Participation is entirely voluntary. Grad student and postdocs may explore sessions in multiple interest groups according to their individual interests. These introductory career experiences leverage existing institutional resources to broaden training experiences for biomedical science predoctoral and postdoctoral trainees. For each Career Interest Team, participants will have options available to them for additional career training opportunities at UF, some of which offer certificates or degree programs.
Review Criteria: Principal Investigator

• OLD
  o Expertise, leadership and time commitment
  o Somewhat discouraging of multiple PI's

• NEW
  ✔ Expertise, leadership, record of rigorous research, time commitment, trained in mentoring, diversity and inclusion
  ✔ Encourage multiple PI's with complementary expertise in training

From “Overview of NIGMS Training and Diversity Program” presented by Allison Gammie at the NIGMS Training, Workforce Development and Diversity Program Directors Meeting, June 2017
Review Criteria: Preceptors/Mentors

OLD

• Focused on numbers, funding, and scientific expertise

NEW

✓ Numbers, funding and expertise
✓ Bandwidth and commitment to training
✓ Must provide research opportunities and teach: experimental design, rigor & reproducibility
✓ Trained mentors
✓ Commitment to diversity and a supportive research environment
✓ Actively promote career development

From “Overview of NIGMS Training and Diversity Program” presented by Allison Gammie at the NIGMS Training, Workforce Development and Diversity Program Directors Meeting, June 2017
Review Criteria: Trainees

OLD

- Mostly whether there are sufficient numbers of “well-qualified” students
- Must have an appointment plan

NEW

- Encourages recruiting and appointing trainees from diverse backgrounds (broadly defined) with the potential to become outstanding scientists (e.g., a holistic review process when accepting and appointing students)
- Emphasizes a retention plan with oversight throughout the entire time in graduate training
Review Criteria: Training Record

OLD

• Completion
• Research accomplishments: (e.g., “high-impact” publications, awards, careers in research, leadership positions)
• Evaluations

NEW

✓ Completion and time to degree (well- vs. under-represented similar)
✓ Demonstrate rigorous research activity that advanced scientific knowledge and/or technologies (e.g., peer-reviewed papers, presentations at scientific meetings, etc.)
✓ Plans for career tracking
✓ Recruitment plans for students from underrepresented groups
✓ Evaluation, outcomes, and dissemination plans; responsive improvements
• Recruitment plans for diversifying the faculty

From “Overview of NIGMS Training and Diversity Program” presented by Allison Gammie at the NIGMS Training, Workforce Development and Diversity Program Directors Meeting, June 2017
Biomedical Science PhD Career Outcomes Beyond Postdoc

(N=465)
Timeline

- **NIH Guide publication**: September 2017 (estimated)
- **Application receipt**: May 2018
- **Initial review**: Oct/Nov 2018
- **NAGMS Council review**: January 2019
- **Earliest award date**: July 2019
### Department of Health and Human Services

**Part 1. Overview Information**

<table>
<thead>
<tr>
<th>Participating Organization(s)</th>
<th>National Institutes of Health (NIH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components of Participating Organizations</td>
<td>National Institute of General Medical Sciences (NIGMS)</td>
</tr>
<tr>
<td>Funding Opportunity Title</td>
<td>National Institute of General Medical Sciences Ruth L. Kirschstein National Research Service Award (NRSA) Predoctoral Institutional Research Training Grant (T32)</td>
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<td>Activity Code</td>
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<tr>
<td>Related Notices</td>
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<tr>
<td>Funding Opportunity Announcement (FOA) Number</td>
<td>PAR-17-341</td>
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</table>

Why is this important?

- The institute that funds (or will fund) YOUR T32 is watching!
- It is only a matter of time before such changes impact all T32s
- Let’s be proactive and build our T32 strategy together
Graduate STEM Education for the 21st Century
Core Competencies for the STEM PhD Degree

1. Develop Scientific and Technological Literacy and Conduct Original Research
   a. specialized expertise
   b. transdisciplinary literacy
   c. identify important problems, articulate original research questions
   d. design a research strategy (quantitative, analytical, theoretical approaches)
   e. evaluate outcomes and select outcomes to pursue
   f. rigorous standards of investigation and mastery of skills
   g. apply professional norms and practices, ethical standards

2. Develop Leadership, Communication, and Professional Competencies
   a. work in collaborative multicultural and multidisciplinary team settings
   b. communicate significance and impact of research to multiple audiences
   c. professional competencies
Recommendations

- Rewarding Effective Teaching and Mentoring
- National and Institutional Data on Students and Graduates
- Ensuring Diverse, Equitable, and Inclusive Environments
- Career Exploration and Preparation for Graduate Students
- Structure of Doctoral Research Activities
- Funding for Research on Graduate STEM Education
- Stronger Support for Graduate Student Mental Health Services
Post-Award Administration Advice

Ronda Breton, Senior Grants Specialist, College of Dentistry

• health insurance, appointments, taxes, budget
Training Program Web Pages

• Consistent format
• Career outcomes graphics
NIH Site Visits

• Lyle Moldawer, PhD
  • trainee diversity
  • PI succession plan
  • trainee interview/selection process
  • mentor/mentee expectations (IDP)
  • evaluation/education standards