Entering Research: Research Mentee Training to Support Undergraduate and Graduate Trainees

The activities you have chosen for your customized curriculum are drawn from *Entering Research* (2nd edition; Branchaw, Butz, & Smith, 2019; Macmillan). The *Entering Research* materials were developed, reviewed, and tested by many partners across the country. Activity developers are acknowledged in the footer of each page. A full listing of partners and funders can be found at CIMERProject.org and in the *Entering Research* book.

Entering Research (2nd Edition)
Complete Curriculum #4
15 Week Seminar for Novice Graduate Students

Career Stage: Graduate Student
Trainees' Prior Level of Research Experience: Novice

Implementation Description: This seminar course was designed for entering graduate students. This course is designed to be taken during the first semester while students are engaging in rotations. However, the activities are also beneficial for direct admit students.

Meta Learning Objectives and Areas of Trainee Development: The learning objectives addressed in this curriculum are indicated below with a check mark. The percentage (%) following each learning objective indicates the proportion of sessions that address that learning objective.

Research Comprehension & Communication Skills

- ✓ Develop Effective Interpersonal Communication Skills (27%)
- ✓ Develop Disciplinary Knowledge (27%)
- ✓ Develop Science Communication Skills (20%)
- ✓ Develop Logical/Critical Thinking Skills (13%)
- ✓ Develop an Understanding of the Research Environment (20%)

Research Ethics

- ✓ Develop Responsible & Ethical Research Practices (13%)

Practical Research Skills

- ✓ Develop Ability to Design a Research Project (6%)
- ✓ Develop Ability to Conduct a Research Project (6%)

Researcher Identity

- ✓ Develop Identity as a Researcher (40%)

Researcher Confidence & Independence

- ✓ Develop Independence as a Researcher (20%)
- ✓ Develop Confidence as a Researcher (13%)

Equity and Inclusion Awareness and Skills

- ✓ Develop Skills to Deal with Personal Differences in the Research Environment (13%)
- ✓ Advance Equity and Inclusion in the Research Environment (20%)

Professional & Career Development Skills

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- ✓   Explore & Pursue a Research Career (40%)
- ✓   Develop Confidence in Pursuing a Research Career (6%)

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Week 1

Course Introduction & Research Expectations

Areas of Trainee Development and Meta Learning Objectives Addressed:
Research Comprehension and Communication Skills
- Develop an Understanding of the Research Environment

Researcher Identity
- Develop Identity as a Researcher

Activities:

- Introductions
- Course Overview
- Research Experience Reflections 1: Entering Research?

Assignments Due: None

Assessment Tools: None

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Week 2

Finding Potential Research Rotation Groups and Mentors

Areas of Trainee Development and Meta Learning Objectives Addressed:

Research Comprehension and Communication Skills
- Develop Effective Interpersonal Communication Skills
- Develop an Understanding of the Research Environment

Researcher Identity
- Develop Identity as a Researcher

Professional and Career Development Skills
- Explore and Pursue a Research Career

Activities:
- Finding Potential Research Rotation Groups & Mentors
- Discuss Research Rotation Evaluation

Assignments Due:
- Identifying Research Rotation Groups
- Contacting Potential Rotation Mentors

Assessment Tools:
- Post-activity mini-reflection exercise & assessment rubric

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Week 3

Aligning Expectations

Areas of Trainee Development and Meta Learning Objectives Addressed:

Research Comprehension and Communication Skills
- Develop Effective Interpersonal Communication Skills

Researcher Identity
- Develop Identity as a Researcher

Research Confidence and Independence
- Develop Independence as a Researcher

Activities:
- Aligning Mentor & Trainee Expectations

Assignments Due:
- Aligning Mentor & Trainee Expectations

Assessment Tools: None

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Week 4

Searching Online Databases

Areas of Trainee Development and Meta Learning Objectives Addressed:

Research Comprehension and Communication Skills
- Developing Logical/Critical Thinking Skills

Practical Research Skills
- Develop Ability to Design a Research Project

Activities:
- Searching Online Databases

Assignments Due:
- Generate a list of keywords for your research area

Assessment Tools: None

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Week 5

Importance of Reading in Graduate School

Areas of Trainee Development and Meta Learning Objectives Addressed:
Research Comprehension and Communication Skills
- Develop Disciplinary Knowledge

Researcher Confidence and Independence
- Develop Independence as a Researcher

Professional and Career Development Skills
- Explore and Pursue a Research Career

Activities:
- Importance of Reading in Graduate School

Assignments Due:
- Read Parker, R. (2012) *Skill development in graduate education*, Molecular Cell. 46:377-381.
- My Lab's Core Journal List

Assessment Tools: None

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Week 6

Article Organization, Comprehension, and Critique

Areas of Trainee Development and Meta Learning Objectives Addressed:
Research Comprehension and Communication Skills
- Develop Disciplinary Knowledge

Professional and Career Development Skills
- Explore and Pursue a Research Career

Activities:
- Article Organization, Comprehension, and Recall

Assignments Due:
- Tools for Handling Your Papers

Assessment Tools: None

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Week 7

Writing in Science

Areas of Trainee Development and Meta Learning Objectives Addressed:
Research Comprehension and Communication Skills
- Develop Disciplinary Knowledge
- Develop Science Communication Skills

Professional and Career Development Skills
- Explore and Pursue a Research Career

Activities:
- Research Writing 4: Research Literature Review and Publishing Process
- Tips for Technical Writers

Assignments Due:
- Read Journal Jargon handout
- Write one paragraph summarizing a task or experiment you have done in the lab

Assessment Tools:
- Tips for Technical Writers - assessment rubric

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Week 8

Data Rigor and Reproducibility

Areas of Trainee Development and Meta Learning Objectives Addressed:
Research Comprehension and Communication Skills
- Develop Disciplinary Knowledge
- Develop Science Communication Skills

Research Ethics
- Develop Responsible and Ethical Research Practices

Practical Research Skills
- Develop Ability to Conduct a Research Project

Activities:
- Research Documentation Process
- Research Documentation: Can you decipher this?

Assignments Due:
- Research Documentation Process
- Bring in copies of your lab notebook

Assessment Tools: None

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Week 9

Research Ethics

Areas of Trainee Development and Meta Learning Objectives Addressed:

Research Comprehension and Communication Skills
- Develop Logical/Critical Thinking Skills
- Develop an Understanding of the Research Environment

Research Ethics
- Develop Responsible and Ethical Research Practices

Researcher Identity
- Develop Identity as a Researcher

Activities:
- Truth and Consequences Article
- Case Study: Selection of Data

Assignments Due:
- Read Couzin, J. (September 2006) **"Truth and Consequences,"** *Science,* 313: 1222-1226. doi:10.1126/science.313.5791.1222

Assessment Tools:
- Post-activity mini-reflection exercise & rubric

Week 10

The Power of Social Persuasion

Areas of Trainee Development and Meta Learning Objectives Addressed:

Research Comprehension and Communication Skills
- Develop Effective Interpersonal Communication Skills

Researcher Confidence and Independence
- Develop Confidence as a Researcher

Professional and Career Development Skills
- Develop Confidence in Pursuing a Research Career

Activities:
- Messages Sent and Received
- The Power of Social Persuasion

Assignments Due: None

Assessment Tools: None

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Week 11

Coping Efficacy

Areas of Trainee Development and Meta Learning Objectives Addressed:

Researcher Confidence and Independence
- Develop Confidence as a Researcher

Equity and Inclusion Awareness and Skills
- Advance Equity and Inclusion in the Research Environment

Activities:
- Coping Efficacy

Assignments Due: None

Assessment Tools: None

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Week 12

Diversity in STEM

Areas of Trainee Development and Meta Learning Objectives Addressed:

Equity and Inclusion Awareness and Skills
- Develop Skills to Deal with Personal Differences in the Research Environment
- Advance Equity and Inclusion in the Research Environment

Activities:
- Diversity in STEM

Assignments Due:
- Read Dr. Quiñones' story
- Watch Dr. deGrasse Tyson's response "What's up with chicks and science?"

Assessment Tools: None

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Week 13

Challenges Facing Diverse Teams

Areas of Trainee Development and Meta Learning Objectives Addressed:
Equity and Inclusion Awareness and Skills
- Develop Skills to Deal with Personal Differences in the Research Environment
- Advance Equity and Inclusion in the Research Environment

Activities:
- Challenges Facing Diverse Teams

Assignments Due: None

Assessment Tools: None

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Week 14

Networking

Areas of Trainee Development and Meta Learning Objectives Addressed:

Research Comprehension and Communication Skills
- Develop Effective Interpersonal Communication Skills
- Develop Science Communication Skills

Researcher Identity
- Develop Identity as a Researcher

Researcher Confidence and Independence
- Develop Independence as a Researcher

Professional and Career Development Skills
- Explore and Pursue a Research Career

Activities:
- Networking 2: What Should Your Network Look Like?
- Introduction to Developing a Curriculum Vitae

Assignments Due: None

Assessment Tools: None

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Week 15

Developing a Curriculum Vitae

Areas of Trainee Development and Meta Learning Objectives Addressed:

Researcher Identity
- Develop Identity as a Researcher

Professional and Career Development Skills
- Explore and Pursue a Research Career

Activities:
- Developing a Curriculum Vitae

Assignments Due:
- Draft Curriculum Vitae

Assessment Tools:
- Comprehensive Course Evaluation & Entering Research Learning Assessment (ERLA) Surveys
  - Trainee self-assessment of learning gains
  - Mentor assessment of trainee learning gains