Undergraduate Mentoring
Best Practices

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Goals

• Pass on recommendations for best practices

• Share and discuss mentoring advice

• Brainstorm ways to create successful undergraduate research experiences
Agenda

- Undergrad Research (UGR)
- UGR best practices
- Common pitfalls
- Brainstorm solutions
- Recommendations
What is UGR?

- Starting point on the continuum
- Typically smaller, structured projects
- Expectations are variable
Types of Experiences at MTSU

- **Class projects** (Virology) part of grade
- **Lab projects** (Genetics) mapping plant genome
- **Small individual projects** (URECA assistants) - inexperienced students for short term
- **High end projects** (Honors, URECA) long term, independent, committee, and report (thesis)
- **Small group projects** (REU) two students
- **Large group projects** (STEP team) diverse group approach
Poll on Types

UNDERGRAD
• In class research projects  
• Freshman/Sophomore  
• High end (publication or thesis)  
• Groups of 2  
• Groups of 5 or more  

GRADUATE
MS or Doctorate  

Undergrads vs Grads

- Less time available
- Background limited

- Lower maturity (technical and emotional)
- Influenced by social factors

- Expectations usually lower
UGR: All About the Student?

- Experience the creative process
- Apply scientific method: form hypotheses and design experiments
- Collect data and interpret
- Hands-on problem-solving
- Communicate scientifically (including presentations, publications)
- Resumé entry
General Best Practices

• (Research your research protégé)
• Communicate regularly
• Set milestones and deadlines
• Define metrics for success
• Have goals for *individual student* in mind
• (Work with groups for added benefits)

“The Role of Mentoring in Undergraduate Research Projects”
Know Your Student

An Investment
Worth your time and money?
Appropriate background?
Self-motivated? GPA?
Goals?
Are you comfortable with them and *vice versa*?

Sources of students
Classroom, Lab
Advising, Student clubs
Assigned through central advisor
Weekly Meeting

• **Face-to-face**
  Reminders & updates by email / text

• **Clear expectations**
  (In)formal agenda

• **Project schedule updates**
  Include background reading, writing, ideas, action items

• **Gauge understanding**
  Overwhelmed? Questions?

• **Cheerleader**
  Encouraging; friendly
Milestones/Deadlines

• Break down the project into small (weekly) deadlines or milestones
• Bigger deadlines (presentations, papers)
• **Four stages of mentoring**
  
  **Initiation** – intro, background, techniques
  Rules (syllabus?), well-defined starting point
  **Cultivation** – regular meetings
  **Transformation** – ownership, ideas
  **Separation** – finishing up

Less ADVICE
Group Projects

- Weekly AND monthly meetings
- Individual responsibilities and goals
- Peer-led learning
- Complicated social interactions
- Higher aspirations?

More data
Less individual research advice

- Can combine undergraduates and graduates for mutual benefit.
Social Aspects

• **Group meetings**
  Use to communicate expectations of presentation level (consider presenting yourself)

Teachable moments

• **Group Lunches**

• **Team dynamics +/-**
  Peer learning / Teamwork

Personality conflicts

Romances
The “Hand-off”

Wrapping up

• Report, presentation (electronic)
• Collect all experimental results
• Clean up work area
• Stay in touch for questions ....

Passing on the project to another student

• Student brain-dumps to next student (& you)
• Teach techniques

http://cra-w.org/GIGCSE11Mentoring/
Mentoring

Step it up during separation stage

- Future plans
- Resume and other portfolio items

MTSU Career Development Center
http://www.mtsu.edu/career/contact.php

Capstone courses in your department

- Networking
- Share personal stories and experiences
- Encourage outreach, recruiting
- Compose recommendation letters
Advice from the Trenches
Metrics for Success

- **End goals** with due dates
  Product – report, presentation, thesis

- **Realistic goals**
  Basics (no negotiation) vs fame and fortune!

- **Consequences**
  Grade, Stipend

*Provide timely warnings!*
Common Pitfalls

• **Student issues**
  Smart in class, but not practical
  Not motivated / engaged

• **Realistic goals**
  Technical roadblocks

• **Consequences**
  Not acting on these
  *or too tough!*
What do you do if.....

1. Student socializes with group and comes in to chat about class and project with the professor, but does not do experiments or write reports.

2. Student graduates without turning in a final report (required for I, then F).

3. Student does not engage in his role in a summer team (paid) but the team still gets work done.
Sources of Frustration

• **Inadequate preparation**
  Did not do ‘homework’
  Lab skills are weak

• **Disorganized environment**
  Missing equipment or supplies
  Not a good ‘lab citizen’

• **Not enough success**
  Need more help
  Technical difficulties
  Makes too many mistakes
What do you do if…..

4. Student does good research but drags feet on the write-up (Honors thesis). He turns in first draft to professor for corrections one week before final draft deadline.

5. You think that the student is not being careful enough to trust the results for publication.

6. Student takes research data with her, including notes.
Recommendations?
Overall Success?

• Valued Results
Poster, publication, recognition, pay
• Personal growth
Confidence, positive experience, relationships, responsibility, professionalism
• Education
Problem-solving, knowledge in area, training
• Career Impact
Knowledge / salable skills / abilities / accomplishments
Insuring Success

• **Resources to improve report quality** *
  Provide a good model for reports/posters – early
  Ask for written updates in correct format

• **Scientific community**
  Group meetings and department seminars

• **Good environment**
  Try to provide a nurturing, organized, and friendly environment for students – cut down on frustration

• **Career Opportunities**
  Clubs, trade meetings, seminars
Faculty Benefits

• **Research Productivity:** get results for 3Ps publications, presentations, proposals

• **Intellectual stimulation:** something new!

• **Professional development:** teaching is part of the job (and you can choose the students!)

• **Personal:** make a difference in student growth and career

• **Publicity** – good for MTSU (& you) Credit, recruitment and perhaps funding
Comments?
Other Resources

STUDENT $

- **On campus**: mtsu.edu/urc
  - URECA - Changes in grants in Fall 2013*
  - Travel grants – up to $400 /$500 per student-yr
  - TLSAMP – research support
- **Off campus**: ORNL (workshop in fall), NASA, other REU

Presentation options

- Scholars Week
- Trade conferences (undergrad division?)