Elective Modules to Broaden Training Experiences for Postdoctoral Scientists

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Director, BRET Office of Career Development
PI, Vanderbilt ASPIRE Program
Vanderbilt University School of Medicine
Agenda

• Overview of module program
• Module case studies
  • Science writing module
  • K-12 STEM teaching module
  • Clinical/research modules
  • Business modules
• Logistics, evaluation, & lessons learned
By the end of this session, you will learn

• Ideas for partners who can help facilitate postdoc professional development

• Lower cost options for providing business training for scientists

• Tips for streamlining logistics of professional development events

• Evaluation strategies to gauge program success and impact
Vanderbilt University

- College of A&S
- Blair School of Music
- Peabody
- School of Engineering
- School of Nursing
  - Graduate School
  - Law School
  - School of Medicine
  - Owen School, Management
  - Divinity
- BRET Office of Career Development | est. 2005
- ~650 PhD students in 15 biomedical PhD programs
- ~450 postdocs in 25 biomedical departments
Broadening Experiences in Scientific Training (BEST)

Leveraging research skills for a variety of career paths and opportunities

VU BEST = ASPIRE program
Value of grant isn’t only monetary

1

2 NIH

3 EVALUATION
ASPIRE Modules

Non-credit bearing elective courses relating to

1) Communication
2) Teaching
3) Clinical research
4) Business & Entrepreneurship

Topics selected after analysis of alumni career outcomes
Began offering modules in 2014

- 10 modules, 10 different teaching partners
- Most meet 1-2 hours/week
- Range from 2-32 sessions
- Capacity = 5 to unlimited
- Designed for PD/GS in biomedical sciences, open to STEM PD/GS
- 487 PD/GS participants to date
### Guiding principles of module design

<table>
<thead>
<tr>
<th>Modules should</th>
<th>Facilitate opportunities to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. be time efficient</td>
<td>1. acquire practical knowledge</td>
</tr>
<tr>
<td>2. be cost-effective</td>
<td>2. put new skills into practice</td>
</tr>
<tr>
<td>3. engage experts as instructors</td>
<td>3. gain insight into specific career path(s)</td>
</tr>
</tbody>
</table>

- Facilitate opportunities to:
  1. acquire practical knowledge
  2. put new skills into practice
  3. gain insight into specific career path(s)
Practical Strategies for Strong Writing

Oral Communication Methods

EQ + IQ = Career Success

Biomedical Research and the Media

STEM Teaching in K-12 Schools

Clinical Laboratory Medicine: Applying Your PhD to Patient Care

Introduction to Principles & Practice of Clinical Research

Technology Commercialization

**Summer Intensive in Entrepreneurship & Commercialization

**Management & Business Principles for Scientists
Fundamental skills

Practical Strategies for Strong Writing
Oral Communication Methods
EQ + IQ = Career Success
Biomedical Research and the Media
STEM Teaching in K-12 Schools

Clinical Laboratory Medicine: Applying Your PhD to Patient Care
Introduction to Principles & Practice of Clinical Research
Technology Commercialization

**Summer Intensive in Entrepreneurship & Commercialization
**Management & Business Principles for Scientists
MODULE CASE STUDIES

- Biomedical Research & Media
- Clinical Laboratory Medicine
- Management & Biz Principles
- IPPCR
- Summer Intensive
Biomedical Research and the Media

• Taught by VU Medical Center (VUMC) New & Public Affairs Office
• 8-1 hr sessions, 6 participants
• Ideal for science journalism, writing, development/nonprofits, public affairs
  • Writing for lay audience
  • Interviewing techniques
  • Media training – VUStar studio
• Discussions with science communicators

News & Public Affairs
Clinical Laboratory Medicine

- Taught by Medical Directors of VUMC Clinical Labs
- 6-2hr sessions, 5 participants
- Role & training pathways of Clinical Lab Medical Directors (microbiology, clinical chem, toxicology, genetics)
- Attend bench rounds in clinical lab (1-on-1) and meetings of Diagnostic Management Team

“\[This short, personalized internship was the perfect introduction to the career of a clinical microbiologist.\]”
Introduction to Principles & Practice of Clinical Research

• Free online course from NIH Clinical Center (Oct-March)
• Clinical research study design, biostats methods, ethics, patient monitoring, research infrastructure
• NIH offers optional exam & Certificate of Completion
• We are remote webcast partner & we supplement w/ campus events.
Two project-based business modules

- Summer Intensive for Entrepreneurship & Commercialization
- Management & Business Principles for Scientists

- Pilot modules funded by 2015 Career Guidance for Trainees award from Burroughs Wellcome Fund
- Combined didactic & project-based learning
- Paid instructors from Schools of Engineering and A&S, and module director from School of Medicine
Summer Intensive for Entrepreneurship and Commercialization

- Taught by Engineering Management Professor
- 6 hrs/wk for 6 weeks (Year 1) or 7 weeks (Year 2)
- Teams choose hypothetical technology and develop commercialization plan and mock pitch
# Summer Intensive syllabus

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Choose Technology</td>
</tr>
<tr>
<td></td>
<td>Project Description • Macroeconomic/Social Environment • Market/Demand Environment</td>
</tr>
<tr>
<td>2</td>
<td>Technological Environment • Competitive Environment</td>
</tr>
<tr>
<td>3</td>
<td>Host/Company Assessment • SWOT Analysis • Technology/Business Intelligence</td>
</tr>
<tr>
<td>4</td>
<td>Product Strategy • Operational Strategy</td>
</tr>
<tr>
<td>5</td>
<td>IP Strategy • Technology Commercialization Strategy</td>
</tr>
<tr>
<td>6</td>
<td>Project Valuation &amp; Financing • Business Simulation Modeling • Real Options Analysis</td>
</tr>
<tr>
<td>7</td>
<td>Business Roadmap</td>
</tr>
<tr>
<td></td>
<td>Final Presentations</td>
</tr>
</tbody>
</table>
Summer Intensive structure - 2015

- **Course deliverables (each group):** written commercialization plan (~75 pages) and final pitch presentation

- **Flipped classroom approach:** students review slides & readings BEFORE class

- **Each session**
  - Discuss assigned course materials (1 hour)
  - All groups present weeks’ work (1 hour)
  - Group work (1 hour)
Summer Intensive structure - 2015

• **Course deliverables (each group):** written commercialization plan (~75 pages) and final pitch presentation

• **Flipped classroom approach:** students review slides & readings BEFORE class

• **Each session**
  - Discuss assigned course materials (1 hour) **→ 1.5 hours**
  - All groups present weeks’ work (1 hour) **→ 1.5 hours**
  - Group work (1 hour)
### 2015 Summer Intensive Feedback (n=19)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree or Strongly Agree</th>
<th>Disagree or Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The module was a valuable use of my time.</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>This module provided me with knowledge that will help guide my future career decisions.</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Working on a project helped drive home concepts taught in class.</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>The amount of time spent on out-of-class work was appropriate.</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>
Summer Intensive structure - 2016

- Course deliverables (each group): written commercialization plan (~75 pages) and final pitch presentation and weekly slide decks
- Flipped classroom approach: students review slides & readings BEFORE class
- Each session
  - Discuss assigned course materials (1 hour)
  - All group present weeks’ work (20 minutes)
  - Group work (1.5 hours)

[But all groups create slide deck each week]
How many hours/week did you spend on the project outside of class? (2016) (n=15)

- 2-3 hours (40%)
- 1-2 hours (20%)
- 3-4 hours (20%)
- Other (20%)
Management & Business Principles for Scientists

- Taught by professor for Managerial Studies in A&S
- 10-2 hr sessions
- Partnered w/ VU Core Facilities who provided projects
- 30 participants in 2015 (6 core mgrs, 15 GS, 6 postdocs)

<table>
<thead>
<tr>
<th>Part 1: Didactic (7 weeks)</th>
<th>Part 2: Projects (3 weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance &amp; Accounting</td>
<td>Teams developed solutions</td>
</tr>
<tr>
<td>Human Resources</td>
<td>to real business problems</td>
</tr>
<tr>
<td>Marketing</td>
<td>faced by VU core facilities</td>
</tr>
<tr>
<td>Technology</td>
<td></td>
</tr>
<tr>
<td>Operations</td>
<td></td>
</tr>
<tr>
<td>Project Management</td>
<td></td>
</tr>
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</table>
Project examples

• Create a 2-year business plan and pricing schedule for a new, high-value automated freezer
• Develop a way to measure the impact of a facility’s services on VU’s research community
• Suggest a strategy for tracking and managing progress of ongoing projects
Module outcomes: impact on trainees (n=22)

<table>
<thead>
<tr>
<th>Comment</th>
<th>Agree/Strongly Agree</th>
<th>Disagree/Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module helped to solidify my career interests.</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Module provided me w/ knowledge that will help guide my career decisions.</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td>Mod was valuable use of my time</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Working on project helped drive home class concepts</td>
<td>20</td>
<td>2</td>
</tr>
</tbody>
</table>
Module outcomes: impact on institution

- Submitted instrumentation grant for biobanking core
- Launched 3D printing service tailored to biomedical labs
- Trainees partnering w/ cores to help implement solutions
MODULE LOGISTICS
Executing modules – “start up costs”

Each module

- Recruit instructor
- Conceptualize/design
- Create branding & promo materials (website & email text, website banners)

Standard for all modules

- Attendance policy
- Instructor guide
- Application form
- Evaluation tool

4-10 hours each

12 hours total
Executing modules – ongoing effort

- Coordinate w/ instructor re: dates/times/support needs
- Find/book space
- Set up application form
- Select & notify participants
- Create sign-in sheets
- Track attendance
- Communicate w/ participants
- Generate Cert. of Completion
- Collect & analyze feedback
- Share feedback w/ instructor
- Outreach to faculty

2-12 hours each
Streamlining application process

• 2 week application period (Aug. for fall, Dec. for spring)

• Take applications via SurveyMonkey using a (mostly) standard form
  • Name, email, status, training year, department
  • Why do you want to take module? 4-8 sentences
  • Confirm attendance policy

• Send CV to Program Manager
PRELIMINARY RESULTS
BEST cross-site evaluation strategy

- Trainee entrance and exit surveys
  - Career goals & outcomes
  - Professional development experiences
  - Perceived support from institution and advisor
- Alumni surveys
- Institutional data collection
  - Participation data
  - Trainee productivity
  - Time-to-degree/training completion
Local evaluation strategy

- Collect feedback via SurveyMonkey using (mostly) standard form
  - Overall rating, content, recommend to friend, etc.
  - Was your advisor aware of your participation?
  - Was your advisor supportive?
- Take module instructors to lunch to thank them and share feedback
The “dosage” is about right

# of sessions

Too few  Too many

Just right

n=130

duration of sessions

Too short  Too long

Just right

n=126
The module content is new and valued.

I learned new information.

- Agree
- Strongly agree
- Disagree or strongly disagree

The module was a valuable use of my time.

- Agree
- Strongly agree
- Disagree or strongly disagree

n=100

n=100
Module impact on career development

Provided me w/ knowledge that will help guide my career decisions.

Helped solidify my career interests.

Helped me identify the next steps in my career planning.

Percent of respondents

Strongly agree | Agree | Disagree | Strongly disagree
Advisor awareness and support for modules

Advisor awareness of trainee participation in module

- Advisor aware
- Advisor unaware
- Not sure

n=153

Perceived advisor support for trainee participation in module

- Supportive
- Neutral
- Don’t know or not supportive

n=79
Overall impressions

Overall quality of module

- Fair
- Poor
- Good
- Excellent

Would you recommend the module to a colleague?

- No
- Yes

n=208
n=212
LESSONS LEARNED
Success stories
What we learned

1. B-school isn’t the only possible partner for business training.
2. Not-for-credit = postdocs can participate.
3. Streamline logistics: develop SOPs, use templates.
4. Ask partners to adapt existing content.
5. Open modules to others to foster goodwill, collaboration.
6. Research advisors aren’t freaking out!
7. Trainees are highlighting their module experience in their job search.
Module toolkit

- Syllabus for all modules
- Module planning timeline and checklist
- Module application form
- Module evaluation form
- Attendance policy

Will be available online at NIHbest.org
Acknowledgements

• NIH BEST award (DP7OD018423)
• Burroughs Wellcome Fund 2015 Career Guidance for Trainees

BEST Team

Abby Brown, Director, Outcomes Analysis
D’Anne Duncan, BEST Consortium Manager
Roger Chalkley, Senior Associate Dean, BRET
Kim Petrie, Director, Career Development
Kathy Gould, Associate Dean, Biomedical Sciences
Ashley Brady, Director, Strategic Partnerships
Kate Stuart, Program Manager, Career Development
Liane Moneta-Koehler, Postdoc (not pictured)
SAVE THE DATE

September 6-7, 2017
Hyatt Regency Orlando

For more information, go to nihbest.org
THANK YOU
STEM Teaching in K-12 Schools

- Taught by VU Center for Science Outreach
- 3-2hr sessions + 1 classroom observation
- K-12 education structure & policies, teaching strategies, careers in K-12 sector
Technology Commercialization

• Taught by VU Center for Technology Transfer & Commercialization

• 6- 1hr sessions

• History of tech transfer, patenting, academic commercialization, start-ups

• Ideal for entrepreneurially-minded academics, careers in tech transfer or start-ups, patent scientists

““ This module helped me see that tech transfer isn’t my career area of interest. ””
Practical Strategies for Strong Writing

• Taught by VU Writing Studio
• 2 sessions, 1.5 hrs each
• Fundamental principles relevant to all types of documents

Very, very valuable. Speakers talked about things which are usually sensed by writers but I've never had an opportunity to listen to such a comprehensive combo of everything at the time. It makes the structure of a manuscript more clear and understandable, both as a writer and reader.
Oral Communication Methods

• Taught by VU Professor of Molecular Physiology
• 4 sessions, 2 hrs each
• Participants develop and present a 10 min research talk

“I received excellent feedback from the instructor and from peers. I learned to accept constructive criticism well in a safe learning environment and greatly appreciate this opportunity before going out to present at a national meeting.”
EQ + IQ = Career Success

• Taught by OCD Program Manager & PCC Psychologist
• 5 sessions, 1.5 hrs each
• Workplace communication, emotional intelligence, building professional relationships