Training for Interdisciplinary Research on Antimicrobial Resistance (TIRAR)

COLUMBIA UNIVERSITY MEDICAL CENTER

Interdisciplinary Education Program in Antimicrobial Resistance

- PI: Kristine Gebbie, RN, DrPH
  Elizabeth Standish Gill Associate Professor of Nursing (SON)
- Co-I: Aaron Mitchell, PhD
  Harold S. Ginsberg Professor of Molecular Pathogenesis & Interim Chair of Microbiology (GSAS)
- Mechanism:

  T90 Research Training/Education grant

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Goal

- Equip a cadre of scholars with interdisciplinary tools critical to address antimicrobial resistance

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Interdisciplinary Research

- Any study or group of studies undertaken by scholars from two or more distinct scientific disciplines. The research is based upon a coceptual model that links or integrates theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines throughout multiple phases of the research process (Aboelela et al, 2006)

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Definition by contrast

	Participants/ discipline	Problem definition	Research Style	Presentation of Findings	
Multi-disciplinary	Two or more disciplines	Same question but different paradigm OR different but related questions	'parallel play'	Separate publications by participants from each discipline	
Inter-disciplinary	Two or more distinct academic fields	Described/defined in language of at least 2 fields, using multiple models or intersecting models	Drawn from more than one, with multiple data sources and varying analysis of same data	Shared publications, with language intelligible to all involved fields	
Trans-disciplinary	Two or more distinct academic fields	Stated in new language or theory that is broader than any one discipline	Combined approaches	Shared publications, probably using at least some new language developed for translation across traditional lines	

Competency

- an individual measure of ***applied skills and knowledge*** *that enable people to perform work*.
- consists of
  - action verb (observable or measurable performance of a worker)
  - content (subject matter, type of performance, specific task)
  - context (limitations or conditions of work environment).

Competency specification

- Identify 21 candidate competencies (literature/experts)
- Recruit 30 Delphi panel members (range of expertise and perspective)
- 2 Delphi rounds with feedback
- Final review of 17 competency statements

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The scholar with an emphasis on interdisciplinary research can

- **Advocate** interdisciplinary research in developing initiatives within a substantive area of study.
- **Engage** colleagues from other disciplines to gain their perspectives on research problems.
- **Express** respect for the perspectives of other disciplines.
- **Read** journals outside of his or her discipline.
- **Interact** in training exercises with scholars from other disciplines.
- **Communicate** regularly with scholars from multiple disciplines.

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- **Attend** scholarly presentations by members of other disciplines.
- **Use** theories and methods of multiple disciplines in developing integrated theoretical and research frameworks.
- **Integrate** concepts and methods from multiple disciplines in designing interdisciplinary research protocols.
- **Investigate** hypotheses through interdisciplinary research.
- **Share** research from his or her discipline in language meaningful to an interdisciplinary team.
- **Collaborate** respectfully and equitably with scholars from other disciplines to develop interdisciplinary research frameworks.

- **Modify** his or her own work or research agenda as a result of interactions with colleagues from fields other than his or her own.
- **Draft** funding proposals for interdisciplinary research programs in partnership with scholars from other disciplines.
- **Disseminate** interdisciplinary research results both within and outside his or her discipline.
- **Author** publications with scholars from other disciplines.
- **Present** interdisciplinary research at venues representing more than one discipline.

Specific TIRAR aims

- Create an interdisciplinary research curriculum
- Develop pre- and post-doctoral training
- Implement a faculty training program
- Develop and maintain self-evaluation and revision

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Faculty Leadership Team

- K. Gebbie (Nursing)
- A. Mitchell (GSAS/Microbiology)
- E. Larson (Nursing & Public Health)
- I. Lapp (PH)
- F. Lowy (P & S)
- R. Myers (Dentistry)

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Training Program Features

- Support for 2 pre-doctoral and 2 post-doctoral scholars
- 3 new graduate-level interdisciplinary courses
- Supervised interdisciplinary field experience in antimicrobial research
- Mentor pre-doctoral fellows into an interdisciplinary dissertation related to antimicrobial resistance
- Develop interdisciplinary research skills among post-doctoral fellows related to anti-microbial resistance
- Provide an Interdisciplinary Research and Training Faculty Development Seminar Series
- Current status: JIT information requested/submitted; no NGA yet

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Predoctoral students

- Applicants – to be drawn from accepted PhD program students:
  - Nursing (Doctor of Nursing Science Program)
  - Arts & Sciences (PhD in Biomedical Science)
  - Public Health (DrPH, PhD)
- Applications considered after completion of home program qualifying exam
- 2 students supported for 2 year interval (yr of grant 01-02, 03-04, 05-06 if renewed)

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Predoctoral training program

- Director – Kristine Gebbie
- Courses (all required):
  - Introduction to Interdisciplinary Research (3 credits) Fall yr 01
  - Interdisciplinary Approaches to Global Antimicrobial Resistance (3 credits) Spring yr 01
  - Interdisciplinary Research Seminar (1 credit) Each semester yr 01-02
  - Supervised Field Experience (2 credits) One semester minimum

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Introduction to Interdisciplinary Research

- Course Directors: Gebbie (SON) & Pincus (P&S)
- Description: Introduce competencies in interdisciplinary research through readings and lectures that focus on interdisciplinary research on antimicrobial resistance.
- Sampling of objectives: The student will have beginning ability to
  - Read journals outside of his or her discipline.
  - Use theories and methods of multiple disciplines in developing integrated theoretical and research frameworks.
  - Share research from his or her discipline in language meaningful to an interdisciplinary team.
  - Modify his or her own work or research agenda as a result of interactions with colleagues from fields other than his or her own.
  - Present interdisciplinary research at venues representing more than one discipline.

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Interdisciplinary Approaches to Global Antimicrobial Resistance

- Course Directors: Mitchell (GSAS) & Saiman (P&S)
- Lecturers: Glied, Rabinowitz, Hammer, Graham, Gebbie, Kubin, Bakken

- Description: To present the global problem of antimicrobial resistance from an interdisciplinary perspective. Discussions will include biologic, sociologic, epidemiologic, statistical, economic, clinical, pharmacologic, health care systems and policy, and bio-behavioral perspectives.

- Sampling of objectives: The student will have beginning ability to
  - Trace the emergence of resistance in specific case studies.
  - Assess prevention and control measures that have been implemented in various settings
  - Design a project to address an antimicrobial resistance problem, using a cross-cutting, interdisciplinary approach.

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Interdisciplinary Research Seminar

- Course Directors: Berkman (SPH) & ?
- Description: a venue for presentation, positive critique and scholarly interchange regarding interdisciplinary research on antimicrobial resistance.
- Participants: pre- and post-doctoral fellows, other students, faculty, and visiting scholars.

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Supervised Field Experience

- Course Directors: The Faculty Leadership Team
- Possible Mentors: ~40 faculty representing all CUMC Schools and diverse departments, and other institutions
- Description: Fellows engage in a laboratory rotation that provides either or both (a) exposure to aspects of resistance research with which they lack prior experience, or (b) utilization of research methods with which they have not developed skill.

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Postdoctoral trainees

- Applicants – prior web-site survey indicates wide interest. Information would be made available on the web site and active advertising to relevant doctoral programs. Successful applicants must be accepted by a CIRAR primary mentor or sponsoring CIRAR laboratory
- 2 postdocs supported for 2 year interval (yr of grant 01-02, 03-04, 05-06 if renewed)

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Postdoctoral training program

- Director – Aaron Mitchell
- Courses:
  - Introduction to Interdisciplinary Research (Required for 3 credits) Fall yr 01
  - Interdisciplinary Approaches to Global Antimicrobial Resistance (3 credits but postdocs are required to TA) Spring yr 01
  - Interdisciplinary Research Seminar (Required) Each semester yr 01-02
  - Supervised Field Experience (Requirement for support; no credits) Two semesters yr 02

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Faculty Development

- Even with interest, not all current faculty have not developed expertise in nurturing interdisciplinary research competencies
- Existing meeting schedule will be augmented by additional presentations and discussions to enhance our capacities

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What if we are funded?

- Applicants – 2 predoc and 1 postdoc so far; more are welcome. (We have not yet advertised.) We will probably add a funded international postdoc to the cohort.
- Courses: We will organize “Antimicrobial Resistance” for Spring 08 with an early lecture from Kris Gebbie on Interdisciplinary Research.
- Then “Interdisciplinary Research” in Fall 08?
- “Supervised Field Experience” will begin immediately

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Conclusion

- Training a new generation of scholars who are prepared to focus on the interdisciplinary questions that must be answered regarding antimicrobial resistance is central to the mission of CIRAR
- Fellows will learn needed scholarly skills and advance science in a critical area

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