Master of Science
Translational Research

Emma A. Meagher, MD
Definition of Translational Research (T1)

Clinical Research

Patient Oriented Research

Proof of Concept
Animals

Proof of Concept
Humans

Phase III Clinical Trials
Observational Studies

Translational Research – T1

Epidemiology
+
Health Services

Bench Research
# Current MD-MTR Students

<table>
<thead>
<tr>
<th>Student</th>
<th>Research Area</th>
<th>Research Project</th>
<th>Mentor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danielle Brewington, BS</td>
<td>Pediatric Gliomas</td>
<td>Mechanisms of acquired resistance to targeted MAPK pathway inhibition in pediatric low-grade gliomas</td>
<td>Adam Resnick, PhD</td>
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<tr>
<td>Ian Danford, BS</td>
<td>Ophthalmology/Glaucoma</td>
<td>The role of mitochondrial genetics in contributing to associated optic neuropathy</td>
<td>Joan O’Brien, MD</td>
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<td>George Fryhofer, BA</td>
<td>Orthopaedic Surgery</td>
<td>Defining the Achilles tendon response to controlled passive motion rehabilitation following acute tendon tear, in comparison to active motion rehabilitation</td>
<td>Louis Soslowsky, PhD</td>
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<tr>
<td>Harry Han, BS</td>
<td>Pediatric Neurology Oncology</td>
<td>The role of ACVR1 and Histone 3 mutations in pediatric diffuse infiltrative pontine gliomas</td>
<td>Adam Resnick, PhD</td>
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<tr>
<td>Eric Lin, BA</td>
<td>Gastroesophageal Cancer</td>
<td>Role of iNOS in Myeloid Derived Suppressor Cell-mediated Immune Suppression in Esophageal Cancer</td>
<td>Anil Rustgi, MD</td>
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<tr>
<td>Andrew Marek, MS</td>
<td>Dermatology</td>
<td>Identification of novel mechanisms and intracellular pathways regulated by GSK-3 and lithium</td>
<td>Carrie Kovarik, MD</td>
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<tr>
<td>Catherine Norise, BA</td>
<td>Neurology</td>
<td>Transcranial Direct Current Stimulation Elucidates Mechanisms of Recovery From Non-Fluent Aphasia</td>
<td>Roy Hamilton, MD, MS</td>
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<tr>
<td>Aeron Small, BA</td>
<td>Cardiology/Genetics</td>
<td>The pathophysiology and clinical progression of aortic valvular disease</td>
<td>Daniel Rader, MD</td>
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<tr>
<td>Wen Xu, BS</td>
<td>Pediatric Craniofacial Surgery</td>
<td>Diagnostic value of spectral domain optical coherence tomography for papilledema in patients with presumed increased intracranial pressure</td>
<td>Jesse Taylor, MD</td>
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General Information

• Enrolls on average 20 students per year
  • MD Students, Residents, Fellows, Pre/Postdoctoral Scientists, Faculty

• 5 - TL1 trainee slots for MD students per year
  • CTSA T1 grant renewal request for an expansion to allow for more trainee slots

• Apply beginning of 3rd year (September)

• Start program end of 3rd year (July)
Overall Goals of MTR Program

• Provide mentored training experience in translational research by combining didactic and experiential experiences in a structured degree granting program

• Prepare trainees to think critically to pose and answer research questions
Overview of Curriculum

• Required Courses
  • 6 credits

• Elective Courses
  • 2 credits

• Required Lab Time
  • 2 credits

• Thesis
  • 2 credits
Core Courses

• Introduction to Biostatistics (MTR 600)

• Review Writing (MTR 601)

• Proposal Development (MTR 602)

• Disease Measurement (MTR 603)

• Scientific & Ethical Conduct (MTR 604)

• Manuscript Writing (MTR 605)
## Sample Study Plan

<table>
<thead>
<tr>
<th>YEAR</th>
<th>FALL AUG - DEC</th>
<th>SPRING JAN - MAY</th>
<th>SUMMER JUL - AUG</th>
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<tbody>
<tr>
<td>1</td>
<td>Module 1</td>
<td>Module 2</td>
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<tr>
<td>2</td>
<td>Module 2</td>
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<td>Module 4</td>
<td>Module 5</td>
<td>MTR 600</td>
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<td>Step 1 USMLE</td>
<td>Research</td>
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<tr>
<td>4</td>
<td>MTR 601, 602, 603 Research</td>
<td>MTR 604, 605, Elective 1 Research</td>
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<tr>
<td>5</td>
<td>2 x MTR 999, Elective 2 Research Project</td>
<td>Module 5 + MTR 607, 608 Research Project</td>
<td>Research Project</td>
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Translational Therapeutics Track

• Focuses on discovery of new treatments in an academic setting and transfer of this technology to industry for implementation in clinical practice.

• Three main components:
  i. core didactic class in Translational Therapeutics (MTR 620)
  ii. an internship in industry
  iii. thesis project with a focus in translational therapeutics.

• Track Director: Steven Siegel, M.D., Ph.D.
Entrepreneurial Science Track

• Offers the opportunity to translate biomedical research into innovative solutions and to develop approaches to commercialization

• Key Components:
  i. Entrepreneurship Seminar (MTR 640)
  ii. Building a Life Sciences Startup (MTR 642)
  iii. Leadership (MTR 641)
  iv. Healthcare Entrepreneurship (HCMG 867)
  v. Internships

• Track Director: Nalaka Gooneratne, MD, MSCE
## Finances

<table>
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<tr>
<th>YEAR</th>
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<th>SPRING</th>
<th>SUMMER</th>
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<tbody>
<tr>
<td>1</td>
<td>Module 1 MD tuition</td>
<td>Module 2 MD tuition</td>
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<tr>
<td>2</td>
<td>Module 2 MD tuition</td>
<td>Module 4 MD tuition</td>
<td>Module 4</td>
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<tr>
<td>3</td>
<td>Modules 4 MD tuition</td>
<td>Module 5 MD tuition</td>
<td>MTR TL1 funding starts June 30th</td>
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<tr>
<td>4</td>
<td>MTR TL1 grant</td>
<td>MTR TL1 grant</td>
<td>MTR TL1 ends June 29th</td>
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<tr>
<td>5</td>
<td>MTR</td>
<td>Module 5 + MTR MD tuition</td>
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Tuition Costs

• Cost of MTR is $58,768
  - Subtract $28,392 (1 semester of MD tuition)
  - Subtract $20,500 (TL1 tuition benefit)
  - Subtract $8,572 (PSOM additional course policy)

• Bottom line tuition cost for TL1 grant funded student is approximately $1,304

• Cost of living stipend of $22,920 to offset delay to earning

• For students receiving merit scholarships the scholarship applies for 7 MD semesters only
Residency programs
- Penn Neurosurgery
- Penn Radiation Oncology x 3
- Penn Internal Medicine X 2
- Penn Integrated Vascular Surgery
- Penn Integrated Plastic Surgery
- Penn Neurosurgery
- Penn Otorhinolaryngology
- Johns Hopkins Internal Medicine
- Mass General Surgery X 2
- Mass General Orthopedic Surgery
- Seattle Children’s Hospital, Pediatrics
- U of Michigan Anesthesiology
- UCLA Neurosurgery
- UCSF Radiation Oncology
- Jefferson Dermatology

Over 40 first author pubs
- JAMA
- Ann Thorac Cardiovasc Surg
- J Am Acad Dermatol
- Blood
- Cancer Biol Ther
- Neurosurg Focus
- Neurocrit Care
- J Vasc Interv Radiol
- J Neurointerv Surg
- Eur J Cardiothorac Surg
- Oncology
- J Craniofac Surg.
MTR Contact Information

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