Agenda

- Panel Introduction
- Program Overview
- Curriculum
- Research Opportunities
- Professional Development + Outcomes

- Student Experience
- Application Process
- Q&A
Questions & Answers

Please submit any questions, using the Questions & Answers Box in Zoom.
Panelists

Stan Gerson, MD
Director, National Center for Regenerative Medicine

Damian Junk, PhD
Assistant Director of Cancer Training & Education

Jessica Ludwig
Master’s Degree Candidate

Lindsey Kaydo
Master’s Degree Candidate
CWRU at a Glance

Undergraduate: 5,383
Graduate and Professional: 6,491
States represented: 50
Countries represented: 94

Faculty (full-time, fall 2018): 3,550
Staff (full-time and part-time, fall 2018): 3,202

Alumni: more than 110,000
Degrees Awarded: 3,536

Library holdings: 4 million volumes
Campus size: 267 acres in University Circle, 400-acre farm in Hunting Valley

Operating budget: $1.2 billion
Endowment funds: $1.887 billion
Gifts and pledges: $182.1 million
Research revenues: $408.5 million
CWRU School of Medicine - Research

#24 in the Nation

#1 in Ohio
National Center for Regenerative Medicine

The National Center for Regenerative Medicine (NCRM) is a partnership among four nationally ranked, medical research powerhouses:

- Case Western Reserve University
- Cleveland Clinic.
- University Hospitals Cleveland Medical Center
- The Ohio State University.

NCRM is led by Stan Gerson, MD:

- Director, NCRM.
- Program Director of the RGME Master’s program.
- RGME Student Independent Study Mentor.
- RGME Course Instructor.
National Center for Regenerative Medicine

NCRM is a leader in:

- Stem cell and regenerative medicine research.
- Developing therapies to benefit patients.
- Compliance with Federal regulations.
- Translating research discovery into business opportunities.

Key NCRM successes:

- NCRM partner, University Hospitals, conducted the first stem cell transplant in Ohio.
- NCRM Member, Arnold Caplan, holds some of the earliest stem cell patents.
- NCRM Leadership and Members have created several private companies.
- NCRM provides Cellular Therapy Integrated Services (CTIS) to facilitate cell therapy clinical trials.
  - CTIS includes a 3,000 square foot Cellular Therapy Manufacturing laboratory with 6 state of the art cleanrooms to produce high clinical grade products.

Arnold Caplan, PhD
Professor,
Department of Biology
Member, NCRM
What is.....

**Regenerative Medicine**
- Regenerating damaged tissue or organs of the body by stimulating them to heal themselves or
- Creating new cells and tissue in the laboratory to safely implant in the body when it cannot heal itself.

**Entrepreneurship**
- Transforming the world by solving big problems with impactful solutions.
- Designing, launching and running a new start-up business from novel scientific discovery.
- Entrepreneurship is about execution of innovative ideas.
Cutting-edge Research
Curriculum: Variety of Concentrations
Unique Interdisciplinary Program
Why Regenerative Medicine & Entrepreneurship?
Internship and/or Research
Faculty Content Experts
Types of Careers and Companies

- Executive
- Cellular Therapy
- Medical Sales
- Biologic-Device Combination Products
- Scientist
- Tissue Engineering
- Gene Editing & Therapy
- Postdoctoral Scholar
- Clinical Research
- Professor
- Biotechnology; Venture; Equity analysis
- Patent law

School of Medicine at Case Western Reserve University
National Center for Regenerative Medicine
Biotechnology Leaders in Regenerative Medicine

- Current leaders recognized by the FDA = Fast tracking discovery to product.
- Projected exponential growth in new companies and technologies = Increased need for trained workforce.
Curriculum

• Our full-time students complete the 30-credit hour master's degree in two years while learning from internationally renowned faculty across the University.

• The core courses provide the foundational elements including stem-cell biology, biomaterial engineering, medical product development, federal regulations, bioethics, and how to take a discovery to market.

• In addition, students select an independent study in either hands-on laboratory research or an industry internship.

• Various science and business development electives, paired with seminars and career development opportunities, round out your tailored experience.

• In lieu of a thesis, students create public presentations and written scientific projects throughout the program.
# Coursework

## First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Fall</td>
<td>RGME 535</td>
<td>Foundations in Regenerative Medicine</td>
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<td>BIOL 491</td>
<td>Contemporary Biology and Biotechnology for Innovation</td>
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<td>Science or Business Development Elective(s)</td>
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<td></td>
<td>-</td>
<td>Seminars</td>
<td>-</td>
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<tr>
<td>Spring</td>
<td>RGME 545</td>
<td>Stem Cell Biology and Therapeutics</td>
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<td></td>
<td>BIOL 492</td>
<td>Contemporary Biology and Biotechnology for Innovation</td>
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<td></td>
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## Coursework

### Second Year

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<th>Semester</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Fall</td>
<td>RGME 560 or RGME 565</td>
<td>Independent Study – Research Project or Internship</td>
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<td></td>
<td>GENE 467</td>
<td>Commercialization and Intellectual Property Management</td>
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<td>-</td>
<td>Science or Business Development Elective(s)</td>
<td>1-6</td>
</tr>
</tbody>
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Science Program Electives

CLBY 450: Cells and Pathogens
CRSP 412: Communication in Clinical Research – Grant Writing
EBME 406: Polymers in Medicine
PATH 416: Fundamental Immunology
PHRM 409: Principles of Pharmacology
PHRM 520: Basic Cancer Biology and the Interface with Clinical Oncology
PHRM 525: Topics in Cell and Molecular Pharmacology
Business Development Program Electives

**ENTP 402**: Starting and Managing Successful Start-up

**ENTP 418**: New Enterprise Development

**IIME 450**: Technology Entrepreneurship: Market Opportunity Analysis

**IIME 450B**: Technology Entrepreneurship: Managerial Decision-Making

**LAWS 4312**: Patent Preparation and Prosecution

**LAWS 5341**: Commercialization and Intellectual Property Management
## Two Year Program

### 2020 - 2021
- **Begin in Fall 2020!**
  - Coursework (~4 one-semester courses)
  - Science Electives (~2 one-semester courses)

### 2021 - 2022
- **Begin in Fall 2021!**
  - Coursework (~2 one-semester courses)
  - Business Electives (~2 one-semester courses)
Research and Internship Experiences

Expert faculty mentors and commercial partners to match your unique training goals.

- Our faculty and partners have world-class expertise with:
  - Various stem cell populations such as immune, epithelial, mesenchymal, and induced pluripotent stem cells.
  - Numerous scientific techniques such as 3-D printing, biomaterial engineering, drug delivery, tissue regeneration, and tissue supportive technologies.
  - Laws, ethical concerns, and regulations for scientific exploration, patient care, and intellectual property protection.
  - All of the steps required to translate a novel scientific discovery into a commercial product or business for patient benefit.
Resources and Professional Development

- Seminars
- Research Ethics
- Presentations
- Career Development
- Networking Resources
- Career and Internship Connections (CICs)
- Minority Graduate Student Organization
- CWRU Graduate Student Senate
- Graduate Student Mentoring
Student Experience

Jessica Ludwig

Lindsey Kaydor
Student Experience

✓ Form relationships
✓ Learn through working directly with faculty
✓ Gain experience in research and business
✓ Develop diverse professional skill set
✓ Personally interactions with faculty and peers
Applications should consist of:
- The completed online application
- Transcripts of undergraduate coursework
- Personal Statement
- Resume or CV highlighting research positions
- Two letters of recommendation
- Official score from the TOEFL exam if you are applying from a foreign country

Start the online application by visiting case.edu/medicine/ncrm/
Financial Support

Our University Financial Aid Office administers all financial aid and has comprehensive information for graduate students on their main website.

Once students are accepted into the program, they should complete the FAFSA application.

To receive federal financial aid, students must:
• Be a US citizen or eligible non-citizen
• Meet additional US Department of Education eligibility.

Types of Aid
Student Loans
For graduate students, there are three types of low-interest loans available. They include:
• Federal Direct Unsubsidized Loans
• Federal Plus Loans
• Private Loans

Outside Scholarships
Students are highly encouraged to search and apply for outside scholarships. Look to outside scholarship search engines, employers, local foundations, clubs, and community scholarship opportunities. Students should notify the Office of University Financial Aid of any outside scholarships received.
Application Timeline

Webinar
Learn more information
Visit Website
Contact Us

Early Application
Deadline: Jan 15, 2020
Visit: case.edu/medicine/ncrm/

Priority Application
Deadline: March 15, 2020
Interview Invitations Begin

Standard Application
Deadline: April 15, 2020

Final Application
Deadline: July 15, 2020
Final admissions decisions

Fall 2020
Classes Begin
Questions?

Email: rgme@case.edu

www.case.edu/medicine/ncrm