Welcome to Bioinformatics MS program at RIT!

- **Feng Cui, Ph.D.**
  Associate Professor & Director
  Graduate Bioinformatics Program

- **Patrick Rynkiewicz**
  Candidate, M.S. in Bioinformatics, RIT

- **Spencer Richman**
  Alumnus, M.S. in Bioinformatics, RIT

Presented by RIT MS Program in Bioinformatics
www.rit.edu/study/bioinformatics-ms

**Reminders:**

- Participants will be muted during the presentation.
- You may use Q&A text box to send your questions
- Questions and discussion at the end.
Program overview
Facilities
Student outcomes
Current faculty research
Current student research and co-op experience
Alumni stories
Q & A
- A 2-year program offering two tracks to students with diverse backgrounds
- A comprehensive bridge program to supplement students’ previous education
- A customized curriculum providing strong foundation in biotech and computer programming
- Research projects and co-op/internship exposing students to real-world problems
- Diversity of skills giving students access to a wide range of career choices

### Curriculum

<table>
<thead>
<tr>
<th>First Year</th>
<th>Industries</th>
<th>Typical Job Titles</th>
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</thead>
<tbody>
<tr>
<td>BIOL-625</td>
<td>Biotech and Life Sciences</td>
<td>Biinformatics Engineer</td>
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<tr>
<td>BIOL-630</td>
<td>Bioinformatics Algorithms</td>
<td>Computational Biologist</td>
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<td>BIOL-635</td>
<td>Bioinformatics Seminar</td>
<td>Software Engineer</td>
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<tr>
<td>BIOL-671</td>
<td>Database Management for the Sciences</td>
<td>Bioinformatics Analyst</td>
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<tr>
<td>BIOL-694</td>
<td>Molecular Modeling and Proteomics</td>
<td>Associate Systems Analyst</td>
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<tr>
<td>MATH-655</td>
<td>Biostatistics</td>
<td>Research Technician</td>
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<td></td>
<td>Graduate Electives*</td>
<td>Developer</td>
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</tbody>
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*Any graduate-level course deemed related to the field of bioinformatics by the program director.

<table>
<thead>
<tr>
<th>Second Year</th>
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<tbody>
<tr>
<td>BIOL-790</td>
<td>Research and Thesis</td>
<td>Bioinformaticist</td>
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</tbody>
</table>
Merit-based Scholarship

Graduate Teaching Assistantship (GTA)

Graduate Research Assistantship (GRA)

Students have numerous job opportunities on and off campus.
Program overview

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Q & A
Genomics Lab
- $1.5 million from NYS
- MiSeq
- NextSeq (forthcoming)

Confocal Microscopy Lab
- $0.5 million from NSF
- Multidisciplinary imaging research

Bioinformatics Epicenter
- Multiple Mac, Unix and Linux machines
- Bioinformatics servers
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Q & A
Not-for-profit

Ph.D. students

Yale University
Cornell University

For-profit

Staff

Pacific Northwest National Laboratory

PGDx Personal Genome Diagnostics™

ANALGESIC SOLUTIONS

Methodist Leading Medicine

PAYCHEX

GOODWIN BIOTECHNOLOGY

University of Colorado
RIT

ROCHESTER REGIONAL HEALTH

BioTelemetry
Program overview
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Q & A
Students are free to find mentors inside or outside RIT (e.g., URMC, RGH).
Research projects in Dr. Cui’s lab

Nucleosomes:
(1) Positioning patterns
(2) Sequence analysis
(3) Predictions
(4) Web server

(Gregory Wright)
(Bader Alharbi)
(Sheetal Nagalakshmi)
(Sridevi Subramanya)

Chromatin p53

Chromatin p53 binding sites:
(1) Site predictions
(2) Sequence analysis
(3) Accessibility
(4) Experimental mapping
(5) Database

(Peter LoVerso)
(Feifei Bao)
(Julia Freewoman)
(Chris Barilla)

Cancer chromatin:
(1) Nucleosome organization around p53 sites
(2) Nucleosome positioning and epigenomics in cancer genome

(Feifei, Bao, Andrew Rosato)

Other projects:
(1) Classification of invasive and non-invasive cancer
(2) Gene regulatory network
(3) BioVR: a VR-based platform for biomolecular visualization

(Benny Yin, Kishan Kc, Jimmy Zhang)
Recent publications in Dr. Cui’s lab

Biomolecular visualization in VR

Cancer distinction by machine learning

Cancer vaccine design

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Student Panelist Research

- **Masters Thesis:**
  *Computational Prediction and Validation of Novel Pathogenesis-Related Protein Functions in Vitis vinifera*
  - Developing a tool for prediction of plant proteins capable of entering fungal infection structures
  - Optimizing validation protocols in the lab

- **Additional Research Topics and Interests:**
  *Molecular Dynamics of SARS-CoV-2 Spike Protein Binding*
  - Manuscript in review on dynamics of conserved binding regions across human and bat coronaviruses
Student Panelist Co-Op Experiences

- **USDA Agricultural Research Service, Geneva NY:** Supported post-doctoral researchers and conducted grape proteomics research
- **Regeneron Pharmaceuticals:** Worked in a development group developing novel quality control metrics

**Benefits of a Co-Op**
- Improve presentation of research
- Networking
- Wide range of programs available to bioinformatics students
- Understanding what it is like to be an employee in the academic, industry, and/or government sectors
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Alumni Stories – Spencer Richman

Masters Thesis:
Applying Systems Pharmacology to the Treatment of Chronic Illness Using Novel Scoring and Translational Methods
Adv. Dr. Gary Skuse, Dr. Gordon Broderick, Dr. Matthew Morris

Current Work:
Bioinformatician - Center for Clinical Systems Biology, Rochester General Hospital
- Algorithm development for pharmacological data integration
- Modelling of chronic illnesses
- Computational support for various projects
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