Department of Physics Orientation
For returning students

• **Part One:** Student Advising (Nata Zazubovits)

  *Break: Group Discussion on Career Development*

• **Part Two:** Developing Your Career (Dr. Kalman Laszlo)

• **Part Three:** CUBCAPS Presentation (Rami Zemouri, Sarabjot Grewal)
This **Fall 2022** term will be a full return to in-person learning at Concordia University. We offer few online courses.

### Fall 2022 PHYS courses

<table>
<thead>
<tr>
<th>In-person</th>
<th>Online (eConcordia)</th>
</tr>
</thead>
<tbody>
<tr>
<td>204</td>
<td>204 EC1</td>
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<tr>
<td>205</td>
<td>205 EC1</td>
</tr>
<tr>
<td>206</td>
<td>284 EC</td>
</tr>
<tr>
<td>224</td>
<td>(Astronomy for non-</td>
</tr>
<tr>
<td>225</td>
<td>physics students)</td>
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<tr>
<td>226</td>
<td></td>
</tr>
</tbody>
</table>

& Weekly research colloquia
COVID 19 relevant information

- Physical distancing is not required while wearing a procedural mask
- Procedural mask is not required in buildings but wearing masks prevents spreading the virus
- Wash hands frequently / use hand sanitizers
- Self-evaluation must be completed every day before coming to campus
- If COVID symptoms are detected, one must stay at home
- For up-to-date information follow [EHS guidelines](#)
Student Advising

Outline

• People you should know
• Spaces in the Dept. of Physics
• Dept. of Physics Programs
  • Important reminders
• Policies of the University and the department
• Resources for students
• BSc program information
  • Your course sequence: important reminders
• Get in touch early and often
People to Know in the Department

❖ **Nata Zazubovits** (BSc Coordinator and Academic Advisor)
  - Office: SP-367.01 ([physics-advising@concordia.ca](mailto:physics-advising@concordia.ca))
  - Zoom and in-person (on campus): Monday-Thursday
  - See ADVISING HOURS

❖ **Marie-Anne Cheong Youne** (on a leave)
  - (Undergraduate Program Assistant - Assistant to the Chair)
  - Office: SP-365.02 ([marie-anne.cheongyoun@concordia.ca](mailto:marie-anne.cheongyoun@concordia.ca))
  - Monday, Wednesday, Friday

❖ **Casey Rae Nunn** (Departmental Administrator)
  - Office: SP-365.02 ([physics.da@concordia.ca](mailto:physics.da@concordia.ca))

❖ **Patrick Doane** (Teaching Labs Coordinator)
  - Office: SP 265.01 ([patrick.doane@concordia.ca](mailto:patrick.doane@concordia.ca))
  - Tuesday-Friday
People to Know in the Department

❖ Dr. Valter Zazubovits (Department Chair)
  o Office: SP-367.03 (valter.zazubovits@concordia.ca)

❖ Dr. Dr. Pablo Bianucci (Graduate Program Director)
  o Office: SP-367.21 (pablo.bianucci@concordia.ca)

❖ Dr. Laszlo Kalman (Undergraduate and Co-op Program Director)
  o Office: SP-365.10 (laszlo.kalman@concordia.ca)

❖ Jasmyn Jin (Interim Assistant to the Chair)
  o Office: SP-365.02 (marie-anne.cheongyoune@concordia.ca)
  o In-person (on campus): Tuesday, Wednesday, Thursday
Department of Physics Spaces
Loyola Campus, Science Pavilion (SP)
West Broadway side
Department of Physics Spaces

SP Building 2\textsuperscript{nd} Floor (West Broadway side)

- Physics Teaching Labs
Department of Physics Spaces

SP Building 2nd Floor (West Broadway side)

- Physics Teaching Labs
Department of Physics Spaces

SP Building 3rd Floor

- Department of Physics Kitchen (SP 367.11)
- Undergraduate Physics Study Room (SP 365.14)
- Offices for most Physics Faculty and TAs
Department of Physics Spaces

Research Labs (see also Department of Physics Research)

SP Building Basement, 3rd & 5th floor, PERFORM Centre
Department of Physics Spaces

Offices where students can study or attend online classes

- Department of Physics Conference Room (SP 365.11)
  Capacity: 10 (mask required at all times)

- Undergraduate Physics Study Room (SP 365.14)
  Capacity: 4 (mask required at all times)

- Physics Data Analysis Study Room (SP 265.03)
  Capacity: 10 (mask required at all times)
B.Sc. Degree Programs
(90 credits total)

- Extended Credit Program (+30 basic science credits if coming from another province or from abroad)
- Major Physics (45 credits + electives and/or minor)
- Specialization in Physics/Biophysics (66 credits including 1 research project (497) + electives/minor)
- Honours – Physics/Biophysics, GPA > 3.3 (72 credits including up to 3 research projects: 289, 389, 496) + electives
- Co-op program (combine with any of the above)
- Minor in Biophysics (24 credits; for those majoring in something else)
B.Sc. Degree Programs

1. Master theoretical (bio)physics

- Year 1: Physics: An Introduction
  Mechanics, Mathematical Theory, Electricity
- Year 2: Principles of Natural Science
  Quantum Theory, Thermodynamics, Magnetism
- Year 3: Modern Directions in Physics
  Transistors, MRIs, Lasers, Photosynthesis

2. Plan, execute, and analyse robust experiments

- Year 1: Principles of Experimental Physics
  Error Analysis, Scientific Reporting
- Year 2: Experimental Design
  Automated Data Collection, Modelling Results
- Year 3: Real Research
  For-credit Research in a Lab in the Department!

3. Develop computational skills

- Year 1: Numerical Analysis
  Solve Equations/Problems with a Computer
- Year 2: Interfacing Experiments
  Remotely Control Instrumentation
- Year 3: Computational Physics
  Neural Networks, Data Analysis, Monte Carlo
Co-Op Program
Combining study with work experience

- Three paid work terms as part of your degree
- Training in CV writing and job application
- Must be a full-time student (>12 credits/term)
- GPA > 2.8
- Contact Dr. Laszlo Kalman for details
- Visit the website of Institute for Co-operative Education:

[https://www.concordia.ca/academics/co-op.html](https://www.concordia.ca/academics/co-op.html)
Policies and Regulations

- **Academic Integrity** (Plagiarism: Don’t do It)
- Intellectual Property

- Physics Diversity and Inclusion **Statement**
  - Groups and Resources
- **Academic Regulations**
- Physics BSc Program Information
Academic Integrity

Concordia University places the principle of academic integrity, that is, honesty, responsibility and fairness in all aspects of academic life, as one of its highest values.

The most common offense under the Academic Code of Conduct is plagiarism, which the Code defines as “the presentation of the work of another person as one’s own or without proper acknowledgement.”

Examples for proper ethical behavior:

- If you complete a homework with someone else, write it down.
- If you use a reference, mention it in your work.
- Be honest on exams.
Online lectures, course notes, and video recordings of classes are the intellectual property of the faculty member.

They may not be distributed, published or broadcast without the permission of the faculty member.

Students are also forbidden to use their own means of recording any elements of a class or lecture without permission of the instructor.

The same applies to similar type of former work done by a fellow student.
Diversity and Inclusion: Building the Next Generation Department of Physics

Our statement:

“Our Department of Physics at Concordia University is a rapidly diversifying environment. We embrace this diversity by a firm commitment to inclusiveness. Everyone who dedicates their time and passion to physics belongs here and deserves to feel equally valued and respected no matter their gender, sexual orientation, ethnicity, religion, age, or disability”.
Diversity and Inclusion

Groups and Resources

- Concordia Student Union / CUBCAPS
- Counselling & Psychological Services
- Women in Physics Canada
- Queer Concordia
- Aboriginal Student Resource Centre
- Multi-Faith and Spirituality Centre
- Access Centre for Students with Disabilities
Academic Regulations

Where do I find information about all of the University’s administrative procedures?

• Consult the Undergraduate Calendar

• Be aware of important Undergraduate Academic Dates

• Talk to your Academic Advisor

NB! Nata Zazubovits (Office: SP-367.01)  
BSc Program Coordinator & Student Advisor

physics-advising@concordia.ca

NB! Or to Dr. Laszlo Kalman (Office: SP 367-01)  
Undergraduate Program Director
• Talk to your Academic Advisor

Want to know more about the department?

Unsure which classes you should take?

Wondering which professor studies what?

Looking for help with a project?

Have a special request? Want to study abroad?
B.Sc. Degree Program Information
Visit the Department of Physics website!

- To switch from Major to Specialization (Physics/Biophysics)
  Send the form from website to Nata Zazubovits (Advisor)

- To initiate the switch from Specialization to Honours
  Speak to Nata Zazubovits.

- Starting your Research Project (289, 389, 496, 497) in this Semester?
  Register as soon as possible by submitting completed (signed!) form from website to: Dr. Laszlo Kalman (UPD)

  before the DNE deadline…
Course Sequences
Major Physics
(illustrative example)

**YEAR 1: 21 PROGRAM CREDITS**

<table>
<thead>
<tr>
<th>FALL</th>
<th>WINTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAST 218</td>
<td>MAST 219</td>
</tr>
<tr>
<td>Multivariable Calculus I</td>
<td>Multivariable Calculus II</td>
</tr>
<tr>
<td>PHYS 232</td>
<td>PHYS 230</td>
</tr>
<tr>
<td>Methods of Theoretical Physics I</td>
<td>Experimental Physics I</td>
</tr>
<tr>
<td>PHYS 245</td>
<td>PHYS 236</td>
</tr>
<tr>
<td>Classical Mechanics</td>
<td>Numerical Methods in Physics with Python</td>
</tr>
<tr>
<td>General Education</td>
<td>PHYS 367</td>
</tr>
<tr>
<td>(3 credits outside physics)</td>
<td>Modern Physics and Relativity</td>
</tr>
<tr>
<td>General Education</td>
<td>General Education</td>
</tr>
<tr>
<td>(3 credits outside science)</td>
<td>(3 credits outside science)</td>
</tr>
</tbody>
</table>

- Theory, experiment, computation.
Course Sequences
Major Physics
(illustrative example)

YEAR 2: 15 PROGRAM CREDITS

<table>
<thead>
<tr>
<th>FALL</th>
<th>WINTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 253</td>
<td>PHYS 252</td>
</tr>
<tr>
<td>Electricity and Magnetism I</td>
<td>Optics</td>
</tr>
<tr>
<td>PHYS 334</td>
<td>PHYS 335</td>
</tr>
<tr>
<td>Thermodynamics</td>
<td>Methods of Theoretical Physics II</td>
</tr>
<tr>
<td>PHYS 377</td>
<td>Elective (3 credits)</td>
</tr>
<tr>
<td>Quantum Mechanics I</td>
<td>Suggested: PHYS 260 Introductory Biophysics</td>
</tr>
<tr>
<td>Elective (3 credits)</td>
<td>Suggested: PHYS 330 Experimental Physics II</td>
</tr>
<tr>
<td>Suggested: PHYS 355 Electronics</td>
<td></td>
</tr>
<tr>
<td>General Education</td>
<td>General Education</td>
</tr>
<tr>
<td>(3 credits outside physics)</td>
<td>(3 credits outside physics)</td>
</tr>
</tbody>
</table>

- Don’t forget to take **electives**.
## Course Sequences
### Major Physics (illustrative example)

**YEAR 3: 9 PROGRAM CREDITS**

<table>
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<tr>
<td>3 PHYS credits</td>
<td>PHYS 354</td>
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<tr>
<td>chosen with academic advisor</td>
<td>Electricity and Magnetism II</td>
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<tr>
<td>Elective (3 credits) Suggested:</td>
<td>PHYS 435</td>
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<tr>
<td>PHYS 436 Methods of Theoretical Physics III</td>
<td>Statistical Physics</td>
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<tr>
<td>PHYS 440 Computational Methods in Physics with Python</td>
<td></td>
</tr>
<tr>
<td>Elective (3 credits) Suggested:</td>
<td>Elective (3 credits) Suggested:</td>
</tr>
<tr>
<td>PHYS 460 Chemical Aspects of Biophysics</td>
<td>PHYS 468 Condensed Matter and Nanophysics</td>
</tr>
<tr>
<td>General Education (3 credits outside physics)</td>
<td>Elective (3 credits) Suggested:</td>
</tr>
<tr>
<td></td>
<td>PHYS 478 Quantum Mechanics II</td>
</tr>
<tr>
<td>General Education (3 credits outside physics)</td>
<td>General Education (3 credits outside physics)</td>
</tr>
</tbody>
</table>

- Start thinking about next year **now.**

Prereq: PHYS 253
Prereq: PHYS 334
Prereq: PHYS 377
Course Sequences Spec. Physics

One example of what can go wrong.

First Winter: I do not take PHYS 367 (sounds hard)
Second Winter: PHYS 367 was fun and totally manageable (oops)

PHYS 367 Modern Physics and Relativity
Winter Only.

Third Fall: I take PHYS 377 but not PHYS 459 (bad time to start following the sequence blindly)

PHYS 377 Quantum Mechanics
Fall only. Prereq: PHYS 367

Third Winter: I can no longer take PHYS 468
Fourth Fall: I finally take PHYS 459
Fourth Winter: I finish with PHYS 468

PHYS 459 Solid State Physics
Fall only. Coreq: PHYS 377

PHYS 468 Condensed Matter and Nanophysics
Winter only. Prereq: PHYS 459

Graduation Delayed One Year : ( : ( : ( 
Contact:
Nata Zazubovits ext: 5167
Laszlo Kalman ext: 5051

Advising:
Th 2PM-3PM,
Zoom ID: 884 5964 1892
Password: Montreal

- Course sequence?
- Transfer credits?
- Struggling?
- Personal difficulties?
- Graduate earlier.
- Research opportunities.
- Career questions.
When to reach out?

- Become Familiar with the Academic Calendar

Important Dates:

- **Sept 19: Add/Drop deadline**
  If you want to take a class, you must enroll before this date! Exceptions do occur, but there is no guarantee. If you drop a class after this date, it will appear as a DISC on your transcript and you will not be refunded. Exceptions are extremely rare and require extensive documentation.

- **December 8: DISC deadline**
  If you are enrolled in a class beyond this date, you unable to drop the class for a DISC. Exceptions do occur, but there is no guarantee.
When to reach out?

Become Familiar with the Academic Calendar

What does it mean?

- If you are on the waitlist for a class, you should follow the materials until Sept 19. If you are enrolled from the waitlist but have not been following the lectures, you will have a hard time catching up.

- If you are uncertain whether you should take a class, you should reach out for advising before Sept 19. You will not be able to take the class otherwise.
Tools for success

• **Attend the department-offered tutorials**
  Register for the tutorials.
  You do not have to attend every session.
  Tutorials are supplementary to the course:
  An opportunity to ask questions.
  A chance to interact with your classmates.

• **Your peers are an important resource**
  Get in touch with each other
  Moodle—use the online forum to discuss
  Teams—free office 365 for all students!
  CUBCAPS reps — Rami Zemouri, Sarabjot Grewal
Jobs/Internships and Grad School

Group Exercise

- On the form, write down the following:
  - Research/Career opportunities which you know of
  - Proposed timeline for: Searching/Making a CV/Applying
  - Properties of a good CV/Cover Letter/Application

- Q: What info should be added to the Physics website
Developing your career
Beyond the classroom

Outline

• Why is doing more than just taking classes useful?
• What can I do (for real)? Opportunities.
• How and when to prepare a good application?
Why do more than taking classes?

• It is fun – it fuels your passion for physics.

• Physics is a discipline, but often it is not a clearly defined career path.

• It takes time to find your path – do it during your BSc!

• Build a strong CV: every experience counts and will open doors.

E.g. (Summer research, Co-op internships, Volunteer research, Student projects/clubs).
Challenges outside the classroom

- Although there are many jobs for physics bachelor’s degree recipients, very few have the word “physics” in the title → How to search for positions?

- Hiring professionals may not understand what a physics student actually knows or is capable of doing → Build a strong CV (get experiences you can show!)

- Faculty may not understand what a physics student actually knows or is capable of doing outside of working in academia → Talk to many faculty, but also to Alumni and Students

- Students have difficulty articulating their strengths and capabilities (communication skills) → Develop “Soft skills” and teamwork.
How to search for positions?

Job titles for physics bachelor’s job seekers

- Core skill set: Critical thinking, Mathematics-based problem solving, data analysis
- Added value: Advanced instrumentation (labs), programming
- For some: go to Graduate School

<table>
<thead>
<tr>
<th>IT and Teaching</th>
<th>Engineering</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Hardware &amp; Software Analyst</td>
<td>Application Engineer</td>
<td>Lab Assistant</td>
</tr>
<tr>
<td>IT Consultant</td>
<td>Associate Engineer</td>
<td>Lab Technician</td>
</tr>
<tr>
<td>Programmer</td>
<td>Design Engineer</td>
<td>Physical Sciences Technician</td>
</tr>
<tr>
<td>Software Engineer</td>
<td>Development Engineer</td>
<td>Research Assistant</td>
</tr>
<tr>
<td>Systems Analyst</td>
<td>Electrical Engineer</td>
<td>Research Associate</td>
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<td>Web Developer Education</td>
<td>Field Engineer</td>
<td>Research Technician</td>
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<tr>
<td>High School Physics Teacher</td>
<td>Laser Engineer</td>
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<tr>
<td>High School Science Teacher</td>
<td>Manufacturing Engineer</td>
<td></td>
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<tr>
<td></td>
<td>Mechanical Engineer</td>
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<td>Optical Engineer</td>
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<td>Project Engineer</td>
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<td></td>
<td>Research Engineer</td>
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<td>Systems Engineer</td>
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<td>Test Engineer</td>
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<td></td>
<td>Research &amp; Technical</td>
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</tbody>
</table>
What goes into a good BSc physics resume/CV?

- Writing a skill-based resume for most job applications.
- Focusing on skills and practical experiences you have and required for the job!
- Avoiding using the same resume; tailoring it to the specific job!
- Translating transferable skill sets for the nontechnical reader
- Writing a summary of technical qualifications
  
  Lab equipment (mention expertise level)
  Microsoft Office, Access
  MatLab, LabView, or similar analytical/instrument control software
  Programming languages (C++, SQL), technologies, and tools
- Only highlighting coursework to demonstrate knowledge of a topic
- Including GPA, overall or major
How to get practical experience

• **Option 1:** Focus on Summer Opportunities (no interference with course work)

• **Option 2:** Do extracurricular activities / or experiential courses

• **Option 3:** Do research during the year

Co-op Internships:
- Mariya Krasteva
  - McGill Space Institute
  - Presto Heinrich-Heine-Universität
  - European Space Agency

Co-op Internships:
- Anastasia Kolokotronis
  - PERFORM Research Center
  - Agilent Technologies (twice)
Summer: Where to find internships & jobs

- Go to Summer Programs and extracurricular activities

A few examples:
- **NSERC USRA** (at any Canadian University) - full time students
- **Concordia USRA** (any Department at Concordia) - full time
- Volunteer or Paid positions in our Department (research, TA)
- **Career-Edge (C-Edge)** – full or part time status (1 Co-op internship)
- **DAAD-RISE**, Germany (German Academic Exchange Service)
- Many more! (see [website](#) and ask Profs & Students)

- Use Google and other sites to find a Summer job:
  - Search by job titles, key words, and industries, not just “physics”.
  - [National Research Council Canada](#)
  - [Indeed](#)
  - [LinkedIn](#)
  - [District3](#)
How to find a MSc topic / school?

- Read research webpages / relevant publications
- Talk to faculty and graduate students! (TAs)
- Attend the weekly Colloquia to see what happens elsewhere
- Get to know research in our Department and University
- Attend Undergraduate Conferences
- Apply to Several Schools/programs! Have a plan B and C.
Research areas & research groups

**Biophysics and Biomedical Physics**
- Dr. Claudine Gauthier | Gauthier Research Group (experimental, cerebral, vascular)
- Dr. Christophe Grova | Grova Research Group (experimental, brain imaging)
- Dr. Brandon Helfield | Helfield Research Group (experimental, biomedical ultrasound)
- Dr. Laszlo Kalman | L. Kalman Research Group (experimental, photosynthetic processes)
- Dr. Rachael (Ré)Mansbach | Mansbach Research Group (molecular dynamics, deep learning, protein folding)
- Dr. Laurent Potvin-Trottier | Potvin Lab (synthetic gene circuits)
- Dr. Valter Zazubovits | Zazubovits Research Group (experimental, biophysics photonics)

**Condensed Matter and Nanomaterial Physics**
- Dr. Pablo Bianucci | Bianucci Research Group (experimental, photonics, materials)
- Dr. Alexandre Champagne | Champagne Research Group (experimental, 2D materials)
- Dr. Saurabh Maiti | Maiti Research Group (theoretical, 2D materials, collective phenomena and quantum phases)
- Dr. Sushil K. Misra | Misra Research Group (experimental, EPR spectroscopy)
- Dr. Gilles Peslierbe | Peslierbe Research Group (material science, photochemistry, computational physical chemistry)
- Dr. Ingo Salzmann | Salzmann Research Group (experimental, organic semiconductors)
- Dr. P. Vasilopoulos | Vasilopoulos Research Group (theoretical, low dimensional systems)
- Dr. Truong Vo-Van | Vo-Van Research Group (experimental, nanotechnology)

**Particle Physics**
- Dr. Mariana Frank | Mariana Frank Research Group (theoretical)
Summer / Grad School: When and how to apply?

• Start Early! **Do your search during the early Fall**

• Consult with Faculty mentors
  (and secure letters of reference)

• Understand the deadlines and what you need
  (good CV, letters of reference, cover letter, transcripts)

• Most deadlines are in Dec – Jan - Feb

• Learn how to write a good CV and Cover letter
  [Career and Planning Services](https://www.concordia.ca/careerplanning) (Concordia)
  [FutureBound](https://www.concordia.ca/futurebound) (formerly FutureReady, Concordia)
  [SPS](https://www.sps-sps.org) (Society of Physics Students)
Extracurricular activities

Student associations
Undergraduate
• CUBCAPS - Concordia Undergraduate Biochemistry Chemistry & Physics Society
• Concordia Student union (CSU)
• Arts and Science Federation of Associations (ASFA)

Student Clubs
• Space Concordia
• Artificial Intelligence Concordia
• Data Intelligence Society of Concordia
• Katalís

Concordia Platforms
• District 3
• PERFORM Centre
• Technology Sandbox (Library)

Annual Events
• Conferences for Undergraduate Women in Physics (CCUWiP)
• Canadian Undergraduate Physics Conference (CUPC)
• Physics Games
• CAP Congress
Networking: Nurturing the Physics Identity

- Physics students need confidence in their career path, and career development opportunities. Peer-to-peer interactions matter!

- Get involved: CUBCAPS, CAP Seminar, Colloquia, Social events.

- Attend Tutorials.

- Space Concordia & AI Concordia are Physics and Engineering Clubs, which regularly attend international science competitions. (more clubs exist)

- District 3 is the Concordia entrepreneurship and start-up incubator, and offers BSc summer innovation jobs and workshops.
Mid-Sized and Close-Knit Department...
...in a Big Multidisciplinary University

It helps you achieve your goals – a few recent graduates:

**Dr. Joshua Island, MSc 2011**  
Assistant Professor  
*University of Nevada, Las Vegas*

**Mr. Patrick Janeiro, BSc 2015**  
Software Developer  
*Cerence Inc.*  
(formerly *Nuance Automotive*)

**Anastasia Kolokotronis, BSc 2018**  
Medical Physics Graduate Student  
*McGill University*

**Dr. Tabassom Hamidfar, PhD 2019**  
Postdoctoral Fellow  
*Northwestern University*
Resources for Career Development

- Society of Physics Students: https://www.spsnational.org/
- American Physical Society: https://www.aps.org/careers/index.cfm
- Our webpage: http://www.concordia.ca/arts/sci/physics/current-students.html (summer and extracurricular, career development)
- Physics Faculty and Graduate Students (Talk to Us!)
- Other Students (The most surprising resource!)

Have a great Fall term!