Department of Physics Orientation
For returning students

Part One: Academic Advising (Mr. Matthew Storms)

Break: Small Group Discussions

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

Part Three: CUBCAPS Presentation (Valérie Courval, Julia Horeczky)
COVID 19: course delivery format

- This **Fall 2021** term will be a combination of in-person, online, remote, and blended learning at Concordia University

**Fall 2021 PHYS courses**

<table>
<thead>
<tr>
<th>In-person</th>
<th>Online (eConcordia)</th>
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<tbody>
<tr>
<td>204/01</td>
<td>204 EC1</td>
</tr>
<tr>
<td>205/01</td>
<td>284 EC</td>
</tr>
<tr>
<td>206</td>
<td>204 EC2</td>
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<tr>
<td>224</td>
<td>204 EC3</td>
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<tr>
<td>225</td>
<td>205 EC</td>
</tr>
<tr>
<td>226</td>
<td></td>
</tr>
<tr>
<td>289</td>
<td></td>
</tr>
</tbody>
</table>

& Weekly research colloquia

**Remote (Zoom)**
- most 224/225/226
- 345
- 436
Physics Student Spaces

Where PHYS students can study or attend online classes

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

- **Data Analysis Study Room (SP 265.03)**
  Capacity: 6, mask required at all times

- **Department of Physics Conference Room (SP 365.11)**
  Back-up space, used for meetings by department too
  Capacity: 10, mask required at all times
COVID 19 safety!

- Physical distancing is not required while wearing a procedural mask.
- Procedural mask is required at all time in buildings (follow mask etiquette).
- 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 (quarantine).
- 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
• Policies of the University and the department
• Resources for students
• Your course sequence: important reminders
• Get in touch early and often
People to Know in the Department

❖ Matthew Storms (BSc Coordinator and Advisor)
  o Office: SP-367.01 ([matthew.storms@concordia.ca](mailto:matthew.storms@concordia.ca))
  o In-person (on campus): Monday-Thursday

❖ Marie-Anne Cheong Youne (Assistant to the Chair & GPA)
  o Office: SP-365.02 ([marie-anne.cheongyoune@concordia.ca](mailto:marie-anne.cheongyoune@concordia.ca))
  o In-person (on campus): Monday, Wednesday, Friday

❖ Patrick Doane (Teaching Labs Coordinator)
  o Office: SP 265.01 ([patrick.doane@concordia.ca](mailto:patrick.doane@concordia.ca))
  o In-person (on campus): Tuesday-Friday

❖ Casey Rae Nunn (Departmental Administrator)
  o Office: SP-365.02 ([physics.da@concordia.ca](mailto:physics.da@concordia.ca))
  o Available online mostly, not usually a student contact point
People to Know in the Department

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

❖ Dr. Alexandre Champagne (Acting Chair & Grad Program Director)
  o Office: SP-367.03 until the Chair's return (or SP 553.09)
  o (A.Champagne@concordia.ca)

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

❖ Dr. Pablo Bianucci (Undergraduate Teaching Labs Director)
  o Office: SP-367.21 (pablo.bianucci@concordia.ca)
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

- New! Data Analysis Study Room (SP 265.03)

  Capacity: 6, mask required at all times
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
B.Sc. Degree Programs

Master theoretical physics and biophysics

Physics & Biophysics
- Theory
- Experiment
- Computation

Plan, execute, and analyze robust experiments

Develop computational skills

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

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!

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
B.Sc. Degree Programs
(90 credits total)

- Minor in Biophysics (24 credits)
- Major Physics (45 credits + electives/minor)
- Specialization in Physics/Biophysics (66 credits + electives/minor + 1 research project (497)
- Honours – Physics/Biophysics, GPA > 3.3 (72 credits + electives + up-to 3 research projects: 289, 389, 496)
- Co-op program (combine with any of the above)
- Extended Credit Program (+30 basic credits if coming from another province or from abroad)
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 Institute for Co-operative Education
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.

**Academic Code of Conduct**

The most common offense under the Academic Code of Conduct is plagiarism.

- if you complete a homework with someone else, write it down;
- if you use references, mention it in your work;
- be honest on exams,
- respect the intellectual property (IP) of faculty and fellow students.
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

Matthew Storms (Office: SP-367.01)
BSc Program Coordinator & Student Advisor
matthew.storms@concordia.ca
To switch from Major to Specialization (Physics/Biophysics)
- Send the form from website to Matthew Storms (Advisor)

To initiate the switch from Specialization to Honours
- Speak to Matthew Storms.

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

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

YEAR 2: 15 PROGRAM CREDITS

<table>
<thead>
<tr>
<th>FALL</th>
<th>WINTER</th>
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<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</td>
</tr>
<tr>
<td></td>
<td>Biophysics</td>
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<tr>
<td>Elective (3 credits)</td>
<td>Suggested: PHYS 330 Experimental</td>
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<tr>
<td></td>
<td>Physics II</td>
</tr>
<tr>
<td>Suggested: PHYS 355 Electronics</td>
<td>General Education</td>
</tr>
<tr>
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<td>(3 credits outside physics)</td>
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</tbody>
</table>

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

**YEAR 3: 9 PROGRAM CREDITS**

<table>
<thead>
<tr>
<th>FALL</th>
<th>WINTER</th>
<th>Prereq: PHYS 253</th>
<th>Prereq: PHYS 334 PHYS 377</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 PHYS credits</td>
<td>PHYS 354</td>
<td></td>
<td></td>
</tr>
<tr>
<td>chosen with academic advisor</td>
<td>Electricity and Magnetism II</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Elective (3 credits) Suggested:</em></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PHYS 436 Methods of Theoretical Physics III</td>
<td></td>
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<tr>
<td>PHYS 440 Computational Methods in Physics with Python</td>
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<tr>
<td><em>Elective (3 credits) Suggested:</em></td>
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<tr>
<td>PHYS 460 Chemical Aspects of Biophysics</td>
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<tr>
<td>General Education</td>
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<tr>
<td>(3 credits outside physics)</td>
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<tr>
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</table>

- Start thinking about next year **now.**
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 me (Matthew Storms) ext: 5167
Advising: MTWR 10AM-11AM, 3PM-4PM
Zoom ID: 911 741 4138; Password: Montreal

For help
- Course sequence?
- Transfer credits?
- Struggling?

&

For a leg up
- Graduate earlier.
- Research opportunities.
- Career questions.
When to reach out?

- Become Familiar with the **Academic Calendar**

Important Dates:

- **Sept 20: 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.

- **November 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?

What does it mean?

- If you are on the waitlist for a class, you should follow the materials until Sept 20. 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 20. 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.

• **You best resource is your peers**
  Get in touch with each other
  Moodle—use the online forum to discuss
  Teams—free office 365 for all students!
  CUBCAPS reps — Julia and Valérie
Jobs/Internships and Grad School

*Group Exercise*

(please engage, this is to get to know each other)

- **On paper** – small groups of 3 (or 2)
- If you need inspiration, you look at this [link](#);
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

IT and Teaching
- Computer Hardware & Software
- Analyst
- IT Consultant
- Programmer
- Software Engineer
- Systems Analyst
- Web Developer Education
- High School Physics Teacher
- High School Science Teacher

Engineering
- Application Engineer
- Associate Engineer
- Design Engineer
- Development Engineer
- Electrical Engineer
- Field Engineer
- General Engineer
- Laser Engineer
- Manufacturing Engineer
- Mechanical Engineer
- Optical Engineer
- Project Engineer
- Research Engineer
- Systems Engineer
- Test Engineer Research & Technical

Research
- Lab Assistant
- Lab Technician
- Physical Sciences Technician
- Research Assistant
- Research Associate
- Research Technician
What goes into a good BSc physics resume/CV?

- Writing a skill-based resume for most job applications.

- Focus on skills and practical experiences you have and required for the job! Avoid using the same resume – tailor it to the specific job!

- Translate transferable skill sets for the nontechnical reader

- Write 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 highlight coursework to demonstrate knowledge of a topic

- Include 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

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

Anastasia Kolokotronis
Co-op Internships:
- 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 Peslherbe | Peslherbe 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)*

**Physics Education**
- Dr. Calvin S. Kalman | Calvin S. Kalman Research Group

**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 (Concordia)
  FutureBound (formerly FutureReady, Concordia)
  SPS (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/artsci/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!
Concordia Undergraduate Biochemistry, Chemistry And Physics Society
Your Representatives in CUBCAPS

JULIA HORECZKY
VP INTERNAL PHYSICS

VALÉRIE COURVAL
VP ACADEMICS PHYSICS
Events
Planned For
Fall 2021

CARNIVAL
NEXT WEEK !!! (SEPTEMBER 17)

PROFESSOR SYMPOSIUM
TBD (AFTER MIDTERMS)
Mentorship Program

MENTEE

▪ IN YOUR FIRST YEAR OF THE PHYSICS PROGRAM (U0 OR U1)
▪ LIKE HAVING SOMEONE HELP YOU THROUGH THE YEAR
▪ WANT HELP MAKING CONNECTIONS WITH PEOPLE IN THE DEPARTMENT

MENTOR

▪ IN YOUR FINAL YEARS OF THE PHYSICS PROGRAM (U3 AND ABOVE)
▪ ARE INTERESTED IN SHARING THE KNOWLEDGE YOU’VE GAINED THROUGHOUT THE PAST FEW YEARS

IF YOU ARE INTERESTED IN THE PROGRAM, YOU CAN REACH OUT TO ZOE TSAVOUSSIS:
ZOE.B.TSAVOUSSIS@GMAIL.COM
EVEN IF YOU DON’T CARE ABOUT CUBCAPS, WE HIGHLY RECOMMEND YOU JOIN THE CONCORDIA PHYSICS UNDERGRAD FACEBOOK PAGE AND THE DISCORD SERVER, SINCE IT WILL BE AN EXCELLENT RESOURCE THROUGHOUT YOUR TIME IN THE PROGRAM

Stay in Contact

ALL OUR SOCIALS:

https://linktr.ee/CUBCAPS

JULIA (VP INTERNAL PHYS)
physinternal.cubcaps@asfa.ca

VALÉRIE (VP ACADEMICS PHYS)
physacademic.cubcaps@asfa.ca