

Mario G. Ivanov

ASTROPHYSICIST | DATA SCIENTIST

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Education

Master of Science in Physics

Sep 2018 – Jan 2021

UNIVERSITY OF ALBERTA

Edmonton, AB

- Thesis: “Physics of Black Hole Formation in Failed Supernovae”
- Advisors: Rodrigo Fernández & Greg Sivakoff

Bachelor of Science in Physics

Sep 2015 – Jun 2018

UNIVERSITY OF ALBERTA

Edmonton, AB

- Major: Astrophysics with First Class Honours

Diploma in Dental Hygiene

Sep 2011 – Jun 2015

UNIVERSITY OF ALBERTA

Edmonton, AB

Research

Physics of Black Hole Formation from Failed Supernovae

Sep 2018 – Jan 2021

GRADUATE ADVISOR: RODRIGO FERNÁNDEZ

- Completed a computationally-heavy project about the birth of black holes.
- Used open-source software, Fortran, Bash, and computing clusters (Compute Canada) to run physics simulations.
- Used Python, FLASH, and VisIt to visualize and process the simulation data.
- Critically read and assessed current research.
- Synthesized and analyzed information used to then solve problems during the project
- Wrote and edited a thesis and a journal article about my project.

Data Processing Pipeline for AstroSat’s LAXPC Instrument

Sep 2018 – Jan 2021

GRADUATE ADVISOR: GREG SIVAKOFF

- Developed a pipeline for processing data from AstroSat’s LAXPC instrument.
- Cleaned raw satellite data and completed reverberation mapping analyses.
- Used Python to read, process, and analyze level 1 (raw) data from the satellite.

The X-ray Emissivity of Low-Density Stellar Populations

May 2017 – Jan 2020

UNDERGRADUATE SUPERVISOR: CRAIG HEINKE

- Completed an exploratory, statistical project about the X-ray emission from different stellar environments.
- Used Python to process our data and apply modern statistical techniques (like Markov Chain Monte Carlo analysis) to it.
- Explored statistical correlations with scientific scrutiny.
- Wrote and edited a journal article about the project.

Upgrading the Undergraduate Physics Labs

May 2016 – Apr 2017

UNDERGRADUATE SUPERVISOR: MARK FREEMAN

- Improved previous physics lab experiments with newer technology or methodology.
- Wrote and edited lab manuals, later to be used by undergraduates to complete the physics labs.
- Proposed new ideas for physics lab experiments that would teach concepts otherwise missed.

Publications

Mass ejection in failed supernovae: EOS and neutrino loss dependence

Jan 2021

M. G. IVANOV, RODRIGO FERNÁNDEZ

- Published in the Astrophysics Journal. ([Click here](#))
- We find that with more realistic equations-of-state, we obtain more pessimistic observational signatures for failed supernovae.

The X-ray Emissivity of Low-Density Stellar Populations

Jan 2020

C. O. HEINKE, M. G. IVANOV, E. W. KOCH, ET AL.

- Published in Monthly Notices of the Royal Astronomical Society. ([Click here](#))
- In low-density environments, we find significant correlations between X-ray emissivity and binary fraction, metallicity, and density.

Presentations & Talks

The X-ray Emissivity of Low-Density Stellar Populations

Jun 2017 – Aug 2019

C. O. HEINKE, **M. G. IVANOV**, E. W. KOCH, ET AL.

- Presented my research at several conferences:
 - CASCA (Canadian Astronomical Society) 2019 Poster
 - APS (American Physical Society) April Meeting 2019 Speaker
 - SEDS (Students for the Exploration and Development of Space) Ascention 2019 Conference Speaker
 - University of Alberta 2017 Summer Research Poster
- I created presentations and gave talks to large audiences of physicists at conferences.

Montreal, QC
Denver, CO
Edmonton, AB
Edmonton, AB

“Are we alone in the Universe?”

Oct 2017

M. G. IVANOV

Bon Accord, AB

- I was the keynote speaker at the “Under the Stars” event held at the Prairie Gardens in Bon Accord, Alberta.
- I gave a one-hour general public presentation about life in our universe.

Employment

Senior Data Scientist

Oct 2021 – Present

ALBERTA GAMING, LIQUOR & CANNABIS

Edmonton, AB

- Mentor and train junior Data Scientists and take a leading role in the further growth and development of the CMI team.
- Discover information within vast amounts of data and enable AGLC to make smarter business decisions.
- Act as an expert for AGLC’s datasets, know what they contain, and how to draw from them/use them.
- Apply data mining techniques to draw the correct and applicable data to solve problems and make recommendations.
- Perform statistical analyses to assure recommendations are astute and analyses are reasonable.
- Build high-quality prediction systems and models that can be automated and relied upon by the business to help with revenue optimizations and purchasing/performance guidance.
- Integrate research data into hard data sets to drive even more advanced recommendations.
- Communicate with and present results and findings to our internal and external stakeholders (senior management, COO, CEO, VPs, product specialists, operators).

Junior Optical Engineer

Aug 2021 – Oct 2021

CONVENIENT BUSINESS SOLUTIONS INC.

Edmonton, AB

- Researched, designed, implemented, scaled and supported various optical technologies using optical software tools like Photon Engineering’s FRED
- Aided in troubleshooting the systems and did root cause failure & stray light analysis.
- Conducted experiments and evaluated designs with numerical simulations.
- Documented the results and presented them to cross-functional teams.
- Worked alongside other engineers on the team to help the team achieve success.

Self-Employed Academic Tutor

Oct 2013 – Jun 2021

IN-PERSON AND ONLINE

Edmonton, AB

- Implement personalized learning plans for each student in a one-on-one environment.
- Communicate effectively to find and solve problem areas clearly.
- Adapt to each students’ learning style to most effectively teach concepts.
- Teach physics, math, engineering, and all high-school natural sciences.

Graduate Physics Teaching Assistant

Sep 2018 – Jan 2021

UNIVERSITY OF ALBERTA PHYSICS DEPARTMENT

Edmonton, AB

- Held office hours for undergraduate and graduate students to ask me questions related to their work.
- Explained concepts in a clear and concise manner, without “just giving” the answer.
- Marked assignments fairly while providing useful personalized feedback on areas of difficulty for each student.

Registered Dental Hygienist

Sep 2015 – Jun 2018

SOUTHWEST SMILES DENTAL CLINIC

Edmonton, AB

- Adapted to and maintained quality work in a quick-paced environment.
- Executed all routine Hygiene treatment to clients at a high standard.
- Developed professional relationships based on respect with the staff and clients.
- Performed all tasks in a team mindset to ensure enjoyable experience for clients.

Casino Games Dealer

Sep 2012 – Oct 2015

ST. ALBERT CENTURY CASINO

St. Albert, AB

- Created a friendly and fun gaming environment for patrons.
- Exercised quick mental math and conflict resolution.
- Maintained professional relationships with pit bosses and game manager.

Teaching & Volunteering

Science Educator

Sep 2014 – Feb 2020

UNIVERSITY OF ALBERTA OBSERVATORY

Edmonton, AB

- Taught astronomy and physics concepts to the general public.
- Answered and discussed questions about anything astronomy or physics-related.
- Operated the observatory telescopes in the domes.
- Worked in a team of volunteers on a regular weekly schedule.

President of Science Hackerspace Student Group

Aug 2016 – May 2018

UNIVERSITY OF ALBERTA STUDENT GROUP

Edmonton, AB

- Oversaw the operation of the student group in “The Shack” (located in CCIS).
- Delegated tasks to appropriate VP members for model approvals, event scheduling, and student tracking.
- Held weekly progress meetings to move the student group in the right direction.
- Helped teach students how to use the tools (3D printers, CNC mill, laser cutter/engraver, and more) in our lab.

Ex-Alta 2 Communications Team Member

Dec 2016 – Dec 2017

UNIVERSITY OF ALBERTA STUDENT GROUP

Edmonton, AB

- Researched open-source communications technologies for CubeSat satellites.
- Worked with communications team to design and assemble open-source designs.
- Worked with the rest of the Ex-Alta 2 team to meet project milestones.

Undergraduate Astronomy Society VP Finance

Sep 2015 – Sep 2017

UNIVERSITY OF ALBERTA STUDENT GROUP

Edmonton, AB

- Accounted for all financial transactions of the UAS student group.
- Worked with the rest of the executive committee to plan and organize events.
- Created monthly financial reports and documented all transactions to be reviewed annually.

Painter and Builder

Apr 2013 – May 2014

HABITAT FOR HUMANITY

Edmonton, AB

- Volunteers build houses for low socioeconomic status communities.
- Helped build fences, decks and walls for houses with other volunteers.
- Painted sections of houses before they were delivered and assembled at their designated locations.

Awards

\$1000	Jason Lang Scholarship , for academic achievement based on GPA.	2017
\$500	Helen Tkachenko , for outstanding achievement in the Russian language.	2013
\$1000	Jason Lang Scholarship , for academic achievement based on GPA.	2013
\$1000	Jason Lang Scholarship , for academic achievement based on GPA.	2012
\$1000	Academic Excellence Scholarship , for superior academic achievement.	2011

Conferences & Workshops

CASCA (Canadian Astronomical Society) 2019

Jun 2019

CONFERENCE ATTENDEE

Montreal, QC

- Gave a poster presentation about work on the X-ray emissivity of low-density stellar populations.
- Website: <http://www.physics.mcgill.ca/casca2019/>

WestGrid Research Computing Summer School

May 2019

WORKSHOP ATTENDEE

Calgary, AB

- Participated in a week-long Python bootcamp covering machine learning, data mining, and scientific computing.
- Website: <https://westgrid.github.io/calgarySummerSchool2019/>

APS (American Physical Society)

Apr 2019

CONFERENCE ATTENDEE

Denver, CO

- Gave a talk about my work on the X-ray emissivity of low-density stellar populations.
- Website: <http://meetings.aps.org/Meeting/APR19/Content/3673>

SEDS (Students for the Exploration and Development of Space) Ascension

Mar 2019

CONFERENCE ATTENDEE

Edmonton, AB

- Gave a talk about my work on the X-ray emissivity of low-density stellar populations.
- Website: <https://sed.s.ca/ascension2019/>

CASCA 2017

CONFERENCE ORGANIZER

- Helped organize all the different conference rooms for talks and attended sessions during my time off.
- Website: <https://sites.google.com/a/ualberta.ca/casca2017/>

May 2017

Edmonton, AB