

Curriculum Vitae

DATE: Aug 19, 2026

Christopher Rudra John Charles Ph.D.

CITIZENSHIP: (1) Canada, (2) United Kingdom of Great Britain & Northern Ireland

Summary Career Highlights to Date

- 2 Journal Special Issues edited / co-edited
- 27 Journal Articles
- 16 Articles in Edited Volumes
- 29 Miscellaneous Academic Publications and Reports
- 3 Adjunct Professorships (active)
- 20 Works of Public Scholarship
- 72 Conferences Papers / Presentations
- 37 Invited Talks
- 2 Keynote Lectures
- 2 Honours and Awards Received
- 17 Invited Classroom Presentations
- 73 Positions of Leadership, Service, Administrative Committees (academic, community)
- 5 Courses Taught
- 11 Graduate Committees (4 students supervised/co-supervised)
- 74 HQP Mentorships of other colleagues
- 2 Direct Supervisions – Staff
- 1 Direct Supervisions – Postdoctoral Fellows
- 2 Direct Supervisions – Graduate (M.Sc., Ph.D.)
- 51 Direct Supervisions – Undergraduate and Co-Op (including returns)
- 4 Direct Supervisions – all NSERC HQP presently active (undergraduate, graduate, PDF)

Detailed Record of Professional Activities and Achievements

1. **SURNAME:** Charles **FIRST NAME:** Christopher **MIDDLE NAME(S):** Rudra John
2. **INSTITUTION:** TRIUMF
Canada's Particle Accelerator Centre
4004 Wesbrook Mall, Vancouver, BC, V6T 2A3, Canada
t: 604-222-1047 ext. 6641
Email: ccharles@triumf.ca
URL: <https://crjcharles.com/>
3. **DIVISION/GROUP:** Accelerator Division, Beam Physics & Delivery Department
4. **PRESENT RANK:** Associate Research Scientist (Tenure-Track) **SINCE:** June 2023
5. **POST-SECONDARY EDUCATION**

University or Institution	Degree	Subject Area	Dates
University of Toronto, Department of Earth Sciences	Ph.D.	Physics and Geology	2013

	Mass spectrometry and ion sources (many types), ultraclean ion-exchange chromatography for meteorites, accelerator mass spectrometry (AMS). Thesis: " <i>Pb-Pb Isotopic and X-Ray Tomographic Constraints on the Origin of Chondrules</i> "		
University of Toronto, Department of Geology	M.Sc.	Physics and Geology	2005
University of Toronto, Department of Physics	Hon.B.Sc.	Astrophysics	2004

6. EMPLOYMENT RECORD

(a) *Prior to TRIUMF*

University, Company or Organization	Rank or Title	Dates
University of Toronto, Department of Earth Sciences, Stable Isotope Laboratory (SIL)	Post-Doctoral Fellow & Laboratory Manager	2016 – 2019
University of Ottawa, Andre E. Lalonde Accelerator Mass Spectrometry Laboratory (AEL-AMS), and University of Toronto, IsoTrace AMS Laboratory	MITACS Post-Doctoral Fellow	2013 – 2016
University of Toronto, Department of Earth Sciences	Sessional Lecturer I	2013 Fall
University of Toronto at Mississauga, Department of Chemical and Physical Sciences	Sessional Lecturer I	2013 Spring

(b) *At TRIUMF*

Rank or Title	Dates
Associate Research Scientist (Tenure-Track) **	June 2023 – present
Ion Source Physicist *	January 2019 – June 2023

* Date of granting of permanent employment: July 25, 2019.

** Board Appointed Employee (BAE) position, equivalent to Assistant Professor Tenure-Track.

7. LEAVES OF ABSENCE

University, Company or Organization at which Leave was taken	Type of Leave	Dates
TRIUMF	Medical	October 2024 – December 16, 2024. Graduated Return to Work Plan (GRWP) to January 27, 2025 + 3 months

8. SPECIAL PROFESSIONAL TRAINING AND QUALIFICATIONS

(a) *Adjunct Professorships*

Summary:

- Active: **n = 3** / Expired or Inactive: **n = 1**
- Non-Adjunct Affiliate Memberships: **n = 1**
- Total Conferrals (active & inactive; all schools, departments, divisions): **n = 6**

School	Title	Department and Faculty	Conferred		Status
			Start	End	
University of Victoria (Victoria, BC, Canada)	Affiliate Member	Dept. of Physics & Astronomy, Faculty of Graduate Studies	2025-11-28	2030-6-30	Active 1 st conferral

Simon Fraser University (Burnaby, BC, Canada)	Adjunct Professor	Dept. of Chemistry , Faculty of Science	2023-10-01	2026-8-31	Active 1 st conferral
	Adjunct Professor	Dept. of Physics, Faculty of Science	TBD	TBD	In-Progress 1 st conferral as of June 2026
University of Toronto (ON, Canada)	Assistant Professor Status Only	Dept. of Earth Sciences , Faculty of Arts & Science	2025-9-01	2028-8-31	Active 1 st conferral
	Associate Graduate Faculty Member	School of Graduate Studies (SGS) and Dept. of Earth Sciences	2025-9-01	2028-8-31	Active 1 st conferral
University of Western Ontario (ON, Canada)	Adjunct Research Professor	Dept. of Earth Sciences , Faculty of Science	2024-9-01	2029-6-30	Active 2 nd conferral
			2020-7-15	2024-8-31	Expired 1 st conferral
	Associate Member	School of Graduate & Postdoctoral Studies	2024-9-01	2029-6-30	Active 2 nd conferral
			2021-7-09	2025-8-31	Expired 1 st conferral

(b) Other Qualifications

(2024) Overhead Crane Operator, Fulford Certification (Vancouver, BC).

- First certification: - conferred February 2020 (expired April 2023), cert. #FOC-OT-00148.
- Present certification: - conferred April 2024 (expiry April 2027), cert. #FOC-OT-00507.

(2020) Commercialization Internship, TRIUMF Innovations (Vancouver, BC). Fall 2019 – Spring 2021.

(2019) Advanced radiation protection training and Canadian Nuclear Energy Worker (NEW) designation, TRIUMF (Vancouver, BC). Summer 2019.

(2018) Certificate in GEANT4 Simulations, University of Texas MD Anderson Cancer Center and Stanford Linear Accelerator Centre (SLAC), (Houston, TX). June 2018.

(2017) Certificate in Isotope Ratio Mass Spectrometry (IRMS) for Elemental Analysis (EA), Mass Spectrometry (MS) and Gas Chromatography (GC). Professional training course (8 days) by Isomass Scientific Inc. (Calgary, AB) and the University of Ottawa (Ottawa, ON). February 2017.

(2016) Priority Management for Scientists, Andrew Sherwood & Associates (Toronto, ON). October 2016.

9. TEACHING

(a) Areas of special interest and accomplishments

My teaching interests aligns with my research program on ion sources for the creation and delivery of stable and radioactive isotope beams for particle accelerator physics. I apply these isotope beams to problems in Early Solar System cosmochemistry and planetary science at ASPIRE (the Astrochemical and Planetary Materials IRradiation Experiment) at TRIUMF where I am the founding PI. I designed and taught my own special topics" undergraduate course (ESS381) at the University of Toronto on the origins of the Solar System that included the injection of radioisotopes (i.e. ²⁶Al, etc) into the early protoplanetary disk, and radioactive isotope chronometers in meteorites. My first teaching position (as a Ph.D. student) was the introductory course ERS120 delivered to over

320 students. Presently, I am co-teaching PHYS522 (University of Victoria) on ion sources and beams in particle accelerator physics from 2026 January onwards

Teaching Philosophy

My teaching philosophy is grounded in openness, collaboration, and independence. I understand the value of diverse cultures and epistemologies, where I promote learning through the individual strengths and interests of students. I treat assignments as opportunities to develop and strengthen bridging knowledge by applying theoretical and practical problems to real world scenarios. I am a champion of equity, diversity and inclusion (EDI) in Canadian natural sciences and engineering (NSE) by creating and delivering innovative STEAM initiatives to increase representation and community participation.

(b)1 Courses Taught at TRIUMF

Session	Course Number	Scheduled Hours	Class Size	Hours Taught			Additional Information
				Lectures	Tutorials	Labs	
2027 2026	PHYS522 A01	Physics and Engineering of Particle Accelerators (0.5 credits) Offered via the University of Victoria with UBC, SFU, and TRIUMF - Taught 6 week section on stable & radioactive ion sources & beams. Other topics include vacuum systems, targets.					
		3/week	15	3/week			

(b)2 Courses Taught at Other Institutions: University of Toronto

Session	Course Number	Scheduled Hours	Class Size	Hours Taught			Additional Information
				Lectures	Tutorials	Labs	
2013/14 II	PLN425H	Research in Planetary Science (Honours Astrophysics Thesis course, 0.5 credits) Department of Astronomy and Astrophysics, St. George Campus					
		5/week	1	(thesis)	5/week		flexible meetings
2013 I	PLN420H	Interdisciplinary Seminar in Astrophysics (0.5 credits) Department of Astronomy and Astrophysics, St. George Campus					
		7/week	1	(seminar)	7/week		
2013 I	ESS381H	Special Topics: Solar System Geology (0.5 credits) Department of Earth Sciences, St. George Campus					
		6/week	14	3/week	2/week	1/week	new designed course
2012/13 II	ERS120H	Planet Earth (Introductory Earth Sciences, 0.5 credits) Department of Chemical and Physical Sciences, Mississauga Campus					
		6/week	320	2/week	1/week	3/week	

(c)1 NSERC HQP Graduate and Post-Doctoral Students: Supervision and Graduate Committee Service (names in bold are current/active students)

Supervision¹ and graduate committee service summary:

- Post-Doctoral supervisions
 - Completed: **n = 0** / ongoing: **n = 1**
- Ph.D. supervisions/co-supervisions
 - Completed: **n = 0** / ongoing: **n = 0**
- M.Sc. supervisions/co-supervisions
 - Completed: **n = 1** / ongoing: **n = 3**
- Total # of Ph.D. and M.Sc. student supervisions/co-supervisions: **n = 4**
- Graduate committees to-date: Ph.D. **n = 4**, M.Sc. **n = 6**

School	Student Name	Program Type	Year		Supervisory Role (supervisor, co-supervisor, committee member)
			Start	Finish	
TRIUMF (BC, Canada)	Chris Griffin	Post-Doctoral (Physics)	2025 Fall	2027 Spring	Supervisor
		Topic: ion sources and beam production (ECR, surface, microwave, EBIS, other novel source developments)			
Univ. of Western Ontario (ON, Canada)	Moumita Roy	M.Sc. (Geology)	2027 Winter	2029 Spring	Committee Member
		Topic: NMR spectroscopy of the Paris CM chondrite			
Univ. of Western Ontario (ON, Canada)	Sasani Ravindya	Ph.D. (Geology)	2027 Winter	2031 Fall	Committee Member
		Topic: impact metamorphism of meteorites and experimental targets.			
Univ. of Victoria. (BC, Canada)	Ben Warfield	Ph.D. (Physics)	2025 Fall	2029 Fall	Committee Member
		Topic: a new Penning ion source to replace the existing microwave ion source at TRIUMF-OLIS for beam production			
Univ. of Victoria. (BC, Canada)	Jasmin Deguire	Ph.D. (Physics)	2025 Fall	2029 Fall	Committee Member
		Topic: numerical modeling of ion source plasmas and beam extraction physics			
Univ. of Toronto (ON, Canada)	Daniel Giannotti	M.Sc. (Planetary Sciences)	2025 Fall	2026 Fall	Co-Supervisor ¹
		Topic: production of a 205Pb spike for high-precision U-Pb geochronology and cosmochemistry			
Simon Fraser U. (BC, Canada)	Layla Haddad (withdrew)	Ph.D. (Physics)	2025 Fall	2025 Fall	Supervisor ¹
		Topic: electron beam ion sources			
Simon Fraser U. (BC, Canada)	Devon Joseph (completed)	M.Sc. (Chemistry, Physics)	2023 Fall	2025 Winter	Supervisor ¹
		Thesis: "Production and Detection of Molecular Beams at CANREB". Defended: 2025/11/28. Submitted: 2025/12/22			
Queens U. (ON, Canada)	Alex Katrusiak	M.Sc. (Physics)	2025 Fall	2027 Fall	Committee Member
		Thesis: Ion source optics, AI, and beam development			
Simon Fraser U. (BC, Canada)	Susan Beale	M. Sc. (Chemistry, Physics)	2025 Summer	2027 Fall	Supervisor ¹
		Thesis: "Radiolysis of water and implications to origins of life"			
Western (ON, Canada)	Morgan Gabor (completed)	M. Sc. (Planetary Science)	2024 Winter	2025 Spring	Committee Member
		Thesis: "Characterization of Abadla 002 CM2: optical, mineralogical, compositional considerations"			
Western (ON, Canada)	Fengke Cao (completed)	Ph.D. (Meteorite Physics)	2020 Fall	2025 Spring	Committee Member

¹ All graduate Ph.D./M.Sc. supervisions at TRIUMF requires each graduate student to be (1) officially enrolled in a program of study at a degree-granting university, and (2) co-supervised between one faculty member at that university and one permanent staff member at TRIUMF with Adjunct Professor status at that university.

Thesis: "Mineralogy, Petrology, and Shock History of Martian Regolith Breccia"
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(c)2 NSERC HQP Undergraduate and Co-Op Students: Supervision and Service (names in bold are current/active students)

Supervision and student service summary:

- # of distinct students: supervisions & co-supervisions
 - Completed: **n = 36** / ongoing: **n = 1**
- Total # of students including returns: supervisions & co-supervisions: **n = 51**

School	Student Name	Program Type	Year		Supervisory Role (supervisor, co-supervisor, committee member)
			Start	Finish	
Chatelech Secondary School (BC, Canada)	Eloise McLaughlin	YES Fellowship, TRIUMF Job # A102682.	2026 Summer	2026 Fall	Supervisor
Simon Fraser U. (BC, Canada)	Mohammad Obeid	Undergrad thesis project.	2026 Fall	2026 Fall	Co-Supervisor
Univ. of British Columbia (BC, Canada)	Safiia Ismagilova	Hon.B.Sc. Physics. a. TRIUMF Co-op Job # JR101860. b. TRIUMF Co-op Job # JR101860.	a. 2026 Spring b. 2026 Winter	a. 2026 Summer b. 2026 Spring	a.b. Supervisor
Heritage Woods Secondary School (BC, Canada)	Leo Spagnut	a. Academic work shadow internship via school. b. Work Experience Program (WEX)	a. 2025 Fall b. 2026 Fall	a. 2026 Spring b. 2026 Winter	a.b. Supervisor
Simon Fraser U. (BC, Canada)	Jacob Mattie	Researcher on microcontrollers, data structures, IC interfacing.	2025 Summer	2026 Fall	Supervisor
Univ. of British Columbia (BC, Canada)	Christopher De Lazzari	Hon.B.Sc., Physics. a. TRIUMF Co-op Job # JR102120. b. YES Fellowship, TRIUMF Job # JR01742.	a. 2026 Summer b. 2025 Summer	a. 2026 Fall b. 2025 Fall	a.b. Supervisor
Univ. of Toronto (ON, Canada)	Hayden Klassen	Hon.B.Sc., Physics. a. TRIUMF Co-op Job # JR102060. b. TRIUMF Co-op Job # JR101536. c. YES Fellowship, TRIUMF Job # JR100805.	a. 2026 Spring b. 2025 Summer c. 2024 Summer	a. 2026 Fall b. 2025 Fall c. 2024 Fall	a.b.c. Supervisor
UVic (BC, Canada)	Susan Beale	Hon.B.Sc., Physics (Radiolysis research assistant).	2025 Winter	2025 Summer	Supervisor

Kwantlen Polytechnic Univ. (BC, Canada)	Shakeel Mohammed	Mechatronics & Adv. Manufacturing Program. Pro Skills & Work Practicum (MAMT1400; 80 hrs).	2024 Winter	2024 Spring	Supervisor
Simon Fraser U. (BC, Canada)	Felix Allen	Hon.B.Sc., Physics. 4 th -year Thesis.	2024 Winter	2024 Spring	Co-Supervisor
Univ. of Waterloo (ON, Canada)	Ariana Pearson	Hon.B.Sc., Physics. TRIUMF Co-op Job # JR100805.	2023 Fall	2023 Winter	Supervisor
MPIK (Heidelberg, Germany)	Philipp Justus	Research exchange project.	2023 Winter	2024 Spring	Supervisor
Univ. of Manitoba (MB, Canada)	Devon Joseph	Hon.B.Sc., Physics. TRIUMF Co-op Job # JR100686.	2023 Spring	2023 Summer	Supervisor
Western (ON, Canada)	Bianca Currie	a. Hon.B.Sc., Earth Sci. (completed). NSERC DG research student. b. Hon.B.Sc., 4 th Year Thesis. Fluka subsurface modeling. c. Hon.B.Sc., Earth Sciences (NSERC DG student).	a. 2023 Spring b. 2022 Fall c. 2022 Summer	a. 2023 Summer b. 2023 Spring c. 2022 Fall	a.b. Co-Supervisor c. Supervisor
Univ. of Waterloo (ON, Canada)	Paige Harford	Hon.B.Sc., Physics. (completed). a. NSERC DG research student. b. TRIUMF Co-op Job # TR-21-1-6. c. TRIUMF Co-op Job # TR-20-2-4. d. TRIUMF Co-op Job # TR-19-3-3.	a. 2022 Fall b. 2021 Winter c. 2020 Spring d. 2019 Summer	a. 2023 Summer b. 2021 Summer c. 2020 Fall d. 2019 Winter	a.b.c.d. Supervisor. c. project delayed due to COVID-19
BCIT (BC, Canada)	Robert Charlton Chris Earis Desmond Ho Elijah Krieger SJ Park Richard Wang Clinton Wong	Industry Sponsored Student Program (ISSP), in Computer Information Technology (CIT), project # 442.	2022 Fall	2022 Winter	Supervisor
BCIT (BC, Canada)	Arshia Aryanfar Uluc Birol Van Boi Hnem Rahadian Irman Jake Martin Ajay Sahota Jeff Wang	Industry Sponsored Student Program (ISSP), in Computer Information Technology (CIT), project # 435.	2022 Fall	2022 Winter	Supervisor
Univ. of Victoria (BC, Canada)	Maia Pysklywec	Hon.B.Sc., Physics & Engineering. TRIUMF Co-op Job # JR100177.	2022 Summer	2022 Fall	Supervisor

BCIT (BC, Canada)	Mattias Henders Ethan Sadowski Chris Spooner Bryan Xing	a. Computer Systems Technology (CST), Diploma Thesis, full-time. b. Industry Sponsored Student Program (ISSP), project # 314.	a. 2022 Spring b. 2022 Winter	a. 2022 Summer b. 2022 Spring	a.b. Supervisor
Univ. of Waterloo (ON, Canada)	Cameron Peters	Hon.B.Sc., Physics. TRIUMF Co-op Job # TR-21-3-6.	2021 Fall	2021 Winter	Supervisor
BCIT (BC, Canada)	Mike Wait	Industry Sponsored Student Program (ISSP), Mech. Eng. Diploma Program.	2021 Summer	2021 Fall	Supervisor
St. Mary's (HX, Canada)	Mathieu Cavenaille	Ph.D. (completed), Accelerator Physics.	2019 Winter	2026 Summer	Advisor (non-committee member)

(c)3 Staff Supervision and Service

Supervision service summary:

- Total # of distinct staff: supervisions or co-supervisions
 - Completed: **n = 1** / ongoing: **n = 1**

Affiliation	Name	Role & Level	Year		Supervisory Role (supervisor, co-supervisor)
			Start	Finish	
TRIUMF	Chris Griffin	Post-Doctoral Fellow (Stable ion sources & beams)	2025-12-01	Ongoing	Supervisor
		Ion Source Physicist (Staff Position)	TBD	TBD	
TRIUMF	Layla Haddad	Research Assistant (level EA1)	2025-09-01	2025-12-31	Supervisor

(c)4 non-NSERC HQP mentored of other colleagues (Post-Doctoral Fellows, Graduate, and Undergraduate Students)

Supervision and student service summary:

- Total # of distinct non-NSERC HQP mentored: **n = 74**

School or Institute	Student Name	Program Type	Year (of my interaction)		Involvement
			Start	Finish	
Selkirk/SIRC, BC	Xavier Machado	B.Sc.	2026 Summer	2026 Summer	Medium
Selkirk/SIRC, BC	Minho Kim	PDF	2026 Summer	ongoing	Low
La Salle, USA	Daryana Atroshyna	B.Sc.	2026 Summer	2026 Summer	Low
IIT (ISM) Dhanbad	Avirup Bose	B.Sc.	2026 Summer	2026 Summer	Low
UBC, BC	Alex Katrusiak	M.Sc.	2026 Summer	2028 Summer	Very High
UBC, BC	Maddox Schaller	Hon.B.Sc.	2026 Spring	2026 Summer	Medium
TRIUMF, BC	Masi Dehghan	Ph.D.	2025 Fall	2026 Fall	Medium
UBC, BC	Tom Speak	PDF	2025 Summer	2025 Fall	High
UBC, BC	Reace Willis	Ph.D.	2025 Summer	2025 Fall	High

UBC, BC	Sam McGrath	Ph.D.	2025 Summer	2025 Fall	High
UBC, BC	Nyx Larwal	Hon.B.Sc.	2025 Summer	2025 Fall	High
UVic, BC	Sujit Suram	Hon.B.Sc.	2025 Spring	2025 Summer	High
TRIUMF, BC	Dwaipayan Ray	PDF	2025 Summer	2025 Fall	Low
UVic, BC	Nathan Clements	Hon.B.Sc.	2025 Summer	2026 Spring	Very High
UMontreal, QC	Laura Dufort-Gagnon	Hon.B.Sc.	2025 Summer	2026 Spring	Very High
UBC, BC	Elsa Yuan	Ph.D.	2024 Spring	ongoing	Very High
UBC, BC	Arieh Irving-Hughes	Hon.B.Sc.	2024 Spring	2026 Spring	Very High
U. Trento, Italy	Matteo Michielan	Ph.D.	2025 Spring	2025 Fall	Very High
U. Victoria, BC	Omar Hassan	Ph.D.	2024 Spring	ongoing	High
TRIUMF, BC	Marco Hartmann	PDF	2025 Spring	ongoing	Very High
TRIUMF, BC	Richard Hermann	PDF	2024 Fall	2025 Fall	Low
MSU, Michigan, USA	Lexanne Weghorn	Ph.D.	2024 Fall	2024 Fall	Very High
TRIUMF, BC	Kia Boon Ng	PDF	2023 Summer	2024 Summer	Medium
U. Calgary, AB	Benham Ashrafkhani	Ph.D.	2019 Fall	2024 Fall	Low
TRIUMF, BC	Joseph Adegun	PDF	2023 Summer	2024 Winter	Very High
TRIUMF, BC	Andrew Weaver	PDF	2023 Summer	2024 Winter	Low
U. Manitoba, MB	Sakshi Kakkar	Ph.D.	2023 Spring	2024 Summer	Low
U. Waterloo, ON	Defne Tayner	Hon.B.Sc.	2023 March	2023 Summer	High
UBC, BC	David Wang	Hon.B.Sc.	2023 March	2023 Summer	High
TRIUMF, BC	Ivana Belosevic	PDF	2022 Fall	2024 Spring	Medium
UBC, BC	Rane Simpson	Ph.D.	2022 Fall	2025 Fall	Medium
McGill, QC	Louis Croquette	M.Sc.	2022 Fall	2025 Fall	Medium
U. Manitoba, MB	Jaime Cardona	Ph.D.	2022 Fall	2026 Summer	Low
TRIUMF, BC	F. Maldonado	PDF	2022 Fall	2023 Spring	Low
U. Calgary, AB	Birk Haertel	PDF	2022 Fall	2025 Summer	High
Liverpool, UK	Aurelia Laxdal	Ph.D.	2021 Summer	2025 Fall	High
UVIC, BC	Olivier Shelbaya	Ph.D.	2021 Spring	2022 Fall	Low
UVIC, BC	Susan Beale	Hon.B.Sc.	2022 Summer	2022 Summer	Low
UBC, BC	Jenn Cheung	Hon.B.Sc.	2022 Spring	2022 Fall	High
Queens, ON	Claire Hamilton	Hon.B.Sc.	2022 Summer	2022 Summer	Low
UVIC, BC	Kayle Majic	Hon.B.Sc.	2022 Summer	2022 Summer	Low
UBC, BC	Yilin Wang	Ph.D.	2022 Summer	2022 Summer	Low
U. Ottawa, ON	Erin Flannigan	Ph.D.	2021 Spring	2022 Spring	Medium
Western, ON	Lindsay Deng	Hon.B.Sc.	2017 Fall	2018 Summer	Very High
U. Toronto, ON	Joanna West	M.Sc.	2017 Fall	2018 Summer	High
U. Toronto, ON	Ann Sullivan-Ojeda	PDF	2018 Summer	2018 Fall	Medium
U. Toronto, ON	Camille Malcolm	M.Sc.	2017 Fall	2018 Summer	High
U. Toronto, ON	Tetyana Gilevska	PDF	2016 Fall	2018 Fall	High
U. Toronto, ON	Oliver Warr	PDF	2016 Fall	2018 Fall	High
U. Toronto, ON	Thomas Giunta	PDF	2016 Fall	2018 Fall	Medium
U. Toronto, ON	Alexs Mloszewski	PDF	2016 Fall	2018 Fall	High
U. Toronto, ON	Masha Shayan	PDF	2016 Fall	2018 Fall	Medium
U. Toronto, ON	Elizabeth Phillips	Ph.D.	2016 Fall	2018 Fall	High
U. Toronto, ON	Kristina DaSilva	M.Sc.	2017 Spring	2017 Fall	High
U. Toronto, ON	Jesse Manna	M.Sc.	2016 Fall	2017 Fall	Medium
U. Ottawa, ON	Jennifer Lee	Hon.B.Sc.	2016 Summer	2016 Fall	Very High
U. Ottawa, ON	Colin Tiessen	M.Sc.	2015 Fall	2016 Summer	Medium
U. Ottawa, ON	Mo Chamma	Hon.B.Sc.	2015 Summer	2016 Spring	High
U. Ottawa, ON	Mathew Herod	Ph.D.	2015 Spring	2015 Summer	Low

U. Ottawa, ON	Maria Stefanescu	M.Sc.	2015 Spring	2015 Summer	Low
U. Ottawa, ON	Daniel Sauve	M.Sc.	2015 Spring	2015 Fall	Low
U. Toronto, ON	Allison Enright	Ph.D.	2014 Fall	2015 Spring	Very High
Polytech Clermont-Ferrand, FR	C. Champeau	M.Sc.	2014 Summer	2014 Fall	Medium
Polytech Clermont-Ferrand, FR	J. Ricard	B.Sc.	2014 Summer	2014 Fall	Medium
Yale, CT	Micheal Lemansky	Hon.B.Sc.	2013 Fall	2014 Spring	Low
Polytech Clermont-Ferrand, FR	S. Naanani	B.Sc.	2013 Summer	2013 Fall	Medium
Polytech Clermont-Ferrand, FR	G. Sauvegrain	B.Sc.	2013 Summer	2013 Fall	Medium
U. Ottawa, ON	Cole MacDonald	M.Sc.	2013 Spring	2013 Winter	High
U. Ottawa, ON	Adam Sookdeo	M.Sc.	2013 Spring	2013 Fall	High
U. Toronto, ON	Guillaume Barlet	Ph.D.	2012 Fall	2013 Spring	Medium
U. Toronto, ON	Levke Koop	M.Sc.	2012 Fall	2013 Winter	High
U. Toronto, ON	Abin Das	Ph.D.	2012 Fall	2013 Spring	Low
U. Toronto, ON	Katrina VanDroglen	Ph.D.	2012 Summer	2013 Spring	Low
Western, ON	Monika Haring	M.Sc.	2011 Summer	2011 Summer	High

(d) **Continuing Education Activities**

Date	Participation	Description	Location
2012 Fall-Winter	Registered Attendee	THE500 – Teaching in Higher Education. A course for Post-Doctoral Fellows and senior Ph.D. candidates on academic teaching	Woodsworth College, University of Toronto, Toronto, ON

(e) **Visiting or Invited Lecturer**

Date	Participation	Description	Location
2027 January TBD	Invited; colloquium	Title: <i>Irradiation of Planetary and Meteoritic Materials at ASPIRE-TRIUMF</i>	Western University, London, ON
2027 January TBD	Invited; ES4412B Origin of Planetary Materials	Title: Age of the Solar System from Radioisotopes in Meteorites	Western University, London, ON
2026 September TBD	Invited; seminar	Title: <i>Irradiation of Planetary and Meteoritic Materials at ASPIRE-TRIUMF</i>	Dept. of Earth Sciences, University of Toronto, Toronto, ON
2026 March 26	Invited; colloquium	Title: <i>ASPIRE: the AStrochemical & Planetary materials IRradiation Experiment at TRIUMF</i>	Dept. of Physics, Univ. of Calgary, Calgary, AB
2026 January 13	Invited; colloquium	Title: <i>ASPIRE: the AStrochemical & Planetary materials IRradiation Experiment at TRIUMF</i>	Dept. of Physics, Univ. of Waterloo, Waterloo, ON
2025 October 24	Invited; Keynote Speaker	BC High School Physics Teachers Association Workshop (attendance 150). Talk title: Student-Driven Multidisciplinary Research with Particle Accelerators at ASPIRE	NRC (Main Hall), Vancouver, BC
2025 March 21	Invited; colloquium	Title: <i>Particle Accelerator Chemistry: Radiolytic Production of Organic Molecules and the Emergence of Life in Extreme Planetary Environments</i>	Dept. of Physics & Astronomy, Univ. of Manitoba. Winnipeg, MB

a. 2025 March 1 b. 2025 February 8	Invited; <i>TRIUMF Saturday Morning Lecture Series</i>	Title: <i>Doing Chemistry with Particle Accelerators: Radiolytic Production of Organic Molecules and the Emergence of Life in Extreme Planetary Environments</i>	a. TRIUMF, Vancouver, BC b. SFU Burnaby Campus, Burnaby, BC
2025 March 6	Invited; Department Seminar	Title: <i>Doing Chemistry with Particle Accelerators: Radiolytic Production of Organic Molecules and the Emergence of Life in Extreme Planetary Environments</i>	Dept. of Physics & Astronomy, Univ. of Victoria. Victoria, BC
a. 2025 March 6 b. 2025 March 4	Invited; PHYS435 A01 Introduction to Accelerator Physics (T. Junginger)	a. in-class demonstration and discussion on plasmas and ion source techniques b. Title: <i>Introduction to Ion Source Physics</i>	Dept. of Physics & Astronomy, Univ. of Victoria. Victoria, BC
2024 July 22	Invited; <i>TRIUMF Science Week</i>	Title: <i>Novel Applications of TRIUMF's Accelerated Beams with ASPIRE</i>	TRIUMF, Vancouver, BC
2024 March 27	Invited; Department Seminar	Title: <i>Doing Chemistry with Particle Accelerators</i>	SFU Burnaby Campus, Burnaby, BC
2023 October 2	Invited; Department Seminar	Title: <i>High-Energy Geochemistry with Accelerated Beams</i>	Dept. of Earth Sciences, University of Toronto, Toronto, ON
a. 2023 January 26 b. 2021 January 28	Invited; ESS3312B Genesis of Meteorites & Planetary Materials (R. Flemming)	Title: <i>Radioactive isotopes & age-dating the Solar System</i>	Western University, London, ON
2021 August 18	Invited; <i>TRIUMF Science Week</i>	Title: <i>Fundamental Physics with AMO Techniques</i>	TRIUMF, Vancouver, BC
2013 May 13-15	Invited; <i>ASTRO (Astromaterials Training & Research Opportunities Short Course)</i>	Title: <i>Radiogenic isotopes and Early Solar System processes</i>	Western University, London, ON
2011 Summer	Invited Speaker	OSSTF – Ontario Secondary Schools Teachers Federation, Professional Development Workshop for Earth & Space Sciences	University of Toronto, Toronto, ON
2011 February 18	Visiting; Geophysics Research Group Seminar	Title: <i>3D Computed-Tomography of Chondrules in NWA 801</i>	Univ. of British Columbia, Vancouver, BC
a. 2010 Nov 19 am b. 2010 Nov 19 pm	Visiting; Graduate Training Workshop, Centre for Planetary Science & Exploration	Two presentations on meteorite age-dating using short-lived and long-lived radiogenic systems, and general astrochemistry / cosmochemistry	Western University, London, ON

10. SCHOLARLY AND PROFESSIONAL ACTIVITIES

(a) *Areas of special interest and accomplishments*

Ion source research and development, including: (i) numerical simulations, (ii) beam transport techniques, (iii) beam production and new developments for stable isotopes and radioactive beams (including molecular beams for fundamental accelerator physics research in atomic, nuclear, and particle physics). Non-traditional applications of accelerator-beam techniques to cosmochemistry, planetary sciences, and the radiolysis of water.

Techniques include ion sources (many types), beam instrumentation, and radiochemistry (i.e., clean column chromatography, mass spectrometry, gas chromatography and sample preparation methods). I am the Principle Investigator of two experimental programs at TRIUMF:

- (1) **P-514**²: A gas-filled radiofrequency quadrupole (RFQ) ion guide facility to produce rare radioactive molecules for fundamental Beyond-Standard Model (BSM) physics searches and interdisciplinary studies, and
- (2) **ASPIRE**³ (**A**strochemical and **P**lanetary materials **I**rradiation **E**xperiment) applying accelerator physics techniques to research problems in Earth & planetary sciences and cosmochemistry. This includes irradiation of materials with energetic light-to-heavy accelerated beams for: (1) radiolysis of ancient subsurface waters and molecular origins of life, (2) space weathering and reflectance spectroscopy of planetary and asteroid surfaces, (3) cosmic ray chemistry on cold interstellar sulphur-bearing grains, (4) electronics testing, (5) irradiation of Early Solar System mineral phases and establishment of isotopic ratios in meteorites, (6) thermochronology of apatite via fission-track age-dating enhancements, and (7) biological studies involving radioactive beam irradiations, and dosing samples with activated media, and

I am also a primary contributor to the (i) **ISAC Charge-State Booster (CSB) upgrade** project, and (ii) **CANREB EBIS project**. For (i) this includes design, installation, and commissioning of a new small electron-cyclotron resonance ion source to feed low charge-state beams of long-lived radioactive elements into the existing ISAC CSB facility, to produce long-lived radioactive beams independent of the ISAC radioactive target stations. For (ii) this includes redesign, simulations, diagnosis, repairs, and testing of the CANREB EBIS for charge-breeding in the ARIEL era at TRIUMF, and construction of a new experimental test-stand for debugging problems with the EBIS electron gun (simulations, mechanical design, Raspberry Pi control system development).

Additional info: www.linkedin.com/in/crjcharles

(b) Research or equivalent contracts (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC)).

Granting Agency	Subject	COMP	\$CDN Per Year	Year	Principal Investigator	Co-Investigator(s)

(c)1 Research or equivalent grants (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC))

Career Totals: Awarded: **n = 7** (\$1.22M) Pending or Submitted: **n = 5** (\$6.92M)

Granting Agency	Subject	COMP	\$CDN Value	Year	Principal Investigator	Co-Investigator(s)
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² See §10(g): Joseph et al. (2025) EMIS XX abstract; Charles et al. (2021) ICIS'21 abstract.

³ See §10(g): Charles et al. (2025) 56th LPSC abstract.

NFRF	Destruction of Microplastics and Forever Chemicals by Enhanced Exposure to Cosmogenic Radiation in High Flux Environments. <u>Exploration (E) Grant</u>	C	\$ 250,000	2026 Submitted	C.R.J. Charles	T. Logan P. Sherpa P. McCausland
NSERC	ASPIRE Planetary Material Irradiations. <u>Research Tools & Instruments (RTI)</u>	C	\$ 150,000	2026 Submitted	C.R.J. Charles	-
NSERC	Reaching the full potential of ARIEL and further develop TRIUMF and UVic's accelerator physics expertise. <u>Discovery Grant (DG), Project</u>	C	\$ 1.08 M	2026 Submitted	T. Junginger	<u>C.R.J. Charles</u> O. Kester B. Laxdal T. Planche A. Gottberg
NSERC	Specialized technical support for experimental nuclear physics in the ARIEL-TRIUMF era. <u>SAP-MRS (Major Resources Support Program)</u>	C	\$ 942,851	2026 Submitted	A. Kwiatkowski	<u>C.R.J. Charles</u> J. Lassen J. Behr C. Andreoiu I. Dillmann M. Wieser T. Brunner G. Gwinner B. Kootte A. Gottberg A. Lennarz G. Hackman S. Malbrunot K. Starosta C. Svensson G. Grinyer R. Thompson C. Ruiz P. Garrett
NSERC	Radioactive Molecules: New Probes for New Physics. <u>SAP-Project</u>	C	\$ 4.5 M	2026 Submitted	S. Malbrunot	<u>C.R.J. Charles</u> G. Gwinner A. Jamison J. Behr A. Madison T. Momose A. Kwiatkowski A. Stolor A. Vutha V. Radchenko
CIFAR	Effects of Ionizing Radiation on Deep Subsurface Habitability. <u>Earth 4D (E4D) Grant</u>	C	\$ 30,000	2025-2027 Awarded (Active)	N. Smith	<u>C.R.J. Charles</u> J. Goordial J. Mustard O. Warr

NRC	Collaborative industry grant for machining time, tooling and materials for ion source developments. <u>SMARTS Grant.</u>	C	\$ 7500	2025-2026 Awarded (Active)	M. Dehnel (Accel-Link)	<u>C.R.J. Charles</u> J. Taylor C. Drew O. Kester
NSERC	Radioactive molecule production in an Ion Reaction Cell (IRC). <u>Discovery Grant, Subatomic Physics Individual (SAPIN)</u>	C	\$ 165,000	2022-2027 Awarded (Active) SAPIN-2022-00026	C.R.J. Charles	-
NSERC	Radioactive Molecules – New Probes for New Physics <u>Discovery Grant, Subatomic Physics Project (SAPPJ)</u>	C	\$ 600,000	2024-2027 Awarded (Active)	S. Malbrunot	J. Behr <u>C.R.J. Charles</u> A. Jamison K. Madison A. Stollow F. Buchinger G. Gwinner A. Kwiatkowski T. Momose A. Vutha
NSERC	RadMol: New Probes for New Physics. <u>Discovery Grant, Subatomic Physics Project (SAPPJ)</u>	C	\$ 1.3 M	2022 Awarded \$160k for 2023-2024 and advised to re-apply	S. Malbrunot	J. Behr F. Buchinger <u>C.R.J. Charles</u> G. Gwinner A. Jamison A. Kwiatkowski K. Madison T. Momose A. Stollow A. Vutha
NSERC	Isotope ratio mass spectrometry	NC	\$ 60,000/y	2016-2018 Awarded	B. Sherwood-Lollar	
MITACS	Accelerator mass spectrometry (Isobar removal using gas-filled RFQ ion guides)	C	\$ 45,000/y	2013-2016 Awarded	W.E. Kieser	J.F. Alary J. Cornett A.E. Litherland

(c)2 **Research or equivalent grants not awarded (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC))**

Career Total: **n = 5** (\$1.396M)

Granting Agency	Subject	COMP	\$CDN Value	Year	Principal Investigator	Co-Investigator(s)
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NFRF	Destruction of Microplastics and Forever Chemicals by Cosmic Radiation. <u>Exploration (E) Grant</u>	C	\$ 250,000	2026	C.R.J. Charles	O. Warr T. Logan P. Sherpa N. Smith I. Cooke R. Scholes G. Slater
NSERC	Enhanced ion beam production for ARIEL at TRIUMF using machine learning methods <u>Discovery Grant, Subatomic Physics Project (SAPPJ)</u>	C	\$ 284,000	2026	O. Kester	C.R.J. Charles T. Planche
NSERC	Tatul'ut: Bringing Science Rendezvous to Remote Indigenous and Under-represented Youth in BC. <u>Promo Science Grant</u>	C	\$ 191,000	2026	M. Alvarez	C.R.J. Charles S. Strauss
NSERC	ASPIRE planetary sample irradiation. <u>Research Tools & Instruments (RTI)</u>	C	\$ 150,000	2025	C.R.J. Charles	I. Cooke
NSERC	RFQ gas cell for radioactive molecule production. <u>Subatomic Physics Envelope - Research Tools & Instruments (RTI) Category 3</u>	C	\$ 521,219	2024	C.R.J. Charles	-

(d) Major Public Presentations

- (2026) "Cosmic Night" invited speaker "Irradiating Space Materials at ASPIRE". Attendance >500, H.R. MacMillan Space Centre (Vancouver Planetarium), Vancouver, BC, December TBD, 2026 (Local). <https://www.spacecentre.ca/events/>
- (2026) "Cosmic Night". Hands-on public demonstrations on life in the universe. Attendance >500, H.R. MacMillan Space Centre (Vancouver Planetarium), Vancouver, BC, December TBD, 2026 (Local). <https://www.spacecentre.ca/events/>
- (2026) "Studying the Origins of Life with Particle Accelerators" as part of "The Universe, Life, and Alien Technology (TriForce)". Attendance >200, Nerd Night North Vancouver, Vancouver, BC, September 23, 2026 (Local). <https://northvan.nerdnite.com/>
- (2026) "Irradiating Space Materials at ASPIRE". Attendance >250, Science Rendezvous (University of British Columbia), Vancouver, BC, May 7, 2026 (Local). <https://science.ubc.ca/events/rendezvous>

- (2025) *"Cosmic Night"*. Hands-on public demonstrations on life in the universe. Attendance >500, H.R. MacMillan Space Centre (Vancouver Planetarium), Vancouver, BC, November 14, 2025 (Local). <https://www.spacecentre.ca/events/>
- (2024) *"Cosmic Night"*. Hands-on public demonstrations on nuclear & stellar nucleosynthesis physics. Attendance >500, H.R. MacMillan Space Centre (Vancouver Planetarium), Vancouver, BC, September 19, 2024 (Local). <https://www.spacecentre.ca/events/>
- (2024) *"Cosmic Night"*. Planetarium show speaker and hands-on public demonstrations on dark matter and beyond Standard Model physics. Attendance >500, H.R. MacMillan Space Centre (Vancouver Planetarium), Vancouver, BC, November 14, 2024 (Local). <https://www.spacecentre.ca/events/>
- (2015) *Career Paths in Science*. Attendance 250, Glenforest High School, STEM event, Mississauga, ON, May 29, 2015 (Local). <https://glenforest.peelschools.org/news>
- (2013) General public talk on meteorites and age-dating. Attendance >1000. North York Astronomical Association, Starfest, Ayton, ON, August 10, 2013 (National). <https://www.nyaa.ca/index.php?page=/sf/sf.home>
- (2013) Public talk on meteorite cosmochemistry and age-dating. Attendance 30, Toronto Public Library, Our Planet in Focus Series, Toronto, ON, May 22, 2013 (Local). <https://www.utoronto.ca/news/blebs-blobs-christopher-charles>
- (2013) Talk on meteorites and age-dating. Attendance 80, Royal Astronomical Society of Canada, Mississauga Branch, Mississauga, ON, February 22, 2013 (Local). <https://mississauga.rasc.ca/speaker-nights/>
- (2012) Public talk on meteorites and age-dating. Attendance >1000. North York Astronomical Association, Starfest, Ayton, ON, August 18, 2012 (National). <https://www.nyaa.ca/index.php?page=/sf/sf.home>
- (2007) *Age of CAI's, Chondrules, and Meteorites*. Attendance 50, Walker Mineralogy Club (c/o the Royal Ontario Museum), September 30, 2007 (Local). <https://www.walkermineralogicalclub.org/>

(e) Invited Online Talks, Webinars

- (2021) *Production and Applications of Radioactive Isotopes*. Attendance 60, Zoom event during COVID-19. Spectrum Alternative School, Toronto District School Board (TDSB), Toronto, ON, June 18, 2021 (Local).
- (2021) *Physics Masterclass*. Attendance 45; hands-on electronics STEM activity Zoom event during COVID-19 (postponed due to COVID-19). Emerging Indigenous Scholars Summer Camp (EISSC) organized by the Pacific Institute for Mathematical Sciences (PIMS) and Langara College, Vancouver, BC, August 2, 2021 (Local).
- (2021) *Electric Paper Circuits* (60 students; hands-on electronics STEM activity, Zoom event during COVID-19). Spectrum Alternative School, TDSB, Toronto, ON, May 25, 2021 (Local).
- (2021) *Colliding Particles Together: How we do it*. Attendance 25, Zoom event during COVID-19. Paul Pena Jewish Dayschool, TDSB, Toronto, ON, May 14, 2021 (Local).
- (2021) *Colliding Particles Together: How we do it*. Attendance 80, Zoom event during COVID-19. STEM Fellowship (<https://stemfellowship.org/>), May 12, 2021 (National).

(f) Invited Local and Institutional Talks

- (2026) *OLIS: the Off-Line Ion Sources facility for stable beams*. Attendance 150, TRIUMF Physical Sciences Division Mixer, **Keynote Speaker**, Vancouver, BC, April 10, 2026 (Local).
- (2025) *ASPIRE: The AStrochemical & Planetary materials IRradiation Experiment – the newest and coolest interdisciplinary experimental facility at TRIUMF!* Attendance 15, TRIUMF, Administration and Office Staff Seminar, Vancouver, BC, August 18, 2025 (Local).
- (2025) *Non-traditional Accelerator-Based Research at ASPIRE-TRIUMF*. Attendance 70, TRIUMF, Student Speaker Series, Vancouver, BC, July 17, 2025 (Local).
- (2025) *Introduction to Science and Research at TRIUMF*. Attendance 13, visiting Maori students (9) and teachers (4) from Wainuiomata High School in Lower Hutt (Wellington), New Zealand. International link to Indigenous culture, arts & sciences via collaboration with UBC Dept. of Critical Indigenous Studies, Dept. of English, and the Residential School History and Dialogue Centre (RSHDC). TRIUMF, Vancouver, BC, June 23, 2025 (Local).
- (2020) *EBIS at CANREB: Update and Progress*. Attendance 150, TRIUMF, Accelerator Division All-Hands Meeting, Vancouver, BC, February 18, 2020 (Local).
- (2019) *Introduction to SIMION – a “Hands-on” Tutorial*. Attendance 5, TRIUMF, student training presentation, Vancouver, BC, September 20, 2019 (Local).
- (2010/11) Grades 10-12 mathematics on mathematical functions. Attendance 40, Danforth Collegiate and Technical Institute, Toronto, ON, multiple dates over Spring-Fall 2010/11 (Local).
- (2007) Grade 9 science on Solar System and astrophysics topics of interest. Attendance 35, Malvern Collegiate Institute, Toronto, ON, *multiple dates* in Spring 2007 (Local).

11. **SERVICE TO TRIUMF**

(a) ***Leadership & Project Leadership***

- (2026) **ARIEL Qualified Coordinator (QC)**. June – December 2026. Job and task coordination between Prime Contractors and TRIUMF, for safety and compliance for the ARIEL project.
- (2026) **Accelerator Lead-team Management (ALM)** committee. Appointed member, TRIUMF Accelerator Division leadership team, March 2026 – ongoing.
- (2026-2025) **DESIGN** (DEvelopment of SIngle board computer experimeNts). Facility leader. Initial project definition and scope stage as of 2025 Fall, for control system developments using Raspberry Pi EPICS. For the **CANREB EBIS electron gun test-stand** (see below).
- (2026-2025) **ISAC Charge-State Booster (CSB)** (facility improvement upgrade). PI and Spokesperson. Initial project definition and scope stage as of 2025 Summer. New plasma chamber, and new small ECR ion source for injection of long-lived radioactive ions into the CSB.
- (2026-2024) **ASPIRE** (AStrochemical and Planetary materials IRradiation Experiment). PI and Spokesperson. Commissioned in 2024 and now taking beam in the medium-energy section of TRIUMF-ISAC.
- (2026-2022) **Project# P-514** (Production of Radioactive Molecules in an RFQ Gas-Cell). PI and Spokesperson. Now in Gate 2 design and simulations stage.
- (2026-2025) **CANREB EBIS & EBIS electron gun test-stand**. Main contributor, for EBIS e-gun repairs / refurbishments, and CANREB EBIS repairs, simulations.

(2022-ongoing) **CHRISUMF Group Meeting**. Regular weekly group meeting for all HQP under my supervision, to discuss progress, issues, give updates, and peer-led discussions.

(b) Areas of Special Interest and Accomplishments

- (2026) Member, TRIUMF Ion Sources Reading Group. Students and staff reading and discussion group on the physics of ion sources and beams.
- (2025) Collaborator, Selkirk Ion Source Research Centre (SIRC), Selkirk College, Nelson, BC. Project started 2024 January in collaboration between TRIUMF, Selkirk College, and the Selkirk Technology Access Centre (STAC in Trail, BC).
- (2024) Scientific equipment acquisitions for experimental projects:
- (1). Mu-metal sheets, 880 kg (1940 lbs), 1-2 mm thick sheets (total value CDN \$227k) for use by magnetic sensitive projects. Acquired via the Paleomagnetic Laboratory, University of Toronto at Mississauga, Mississauga, ON, April 2019.
 - (2). TRITON thermal ionization mass spectrometer (total value CDN \$1M) for use at ASPIRE and other accelerator physics projects. Acquired via the Department of Earth, Ocean, Atmospheric Sciences (EOAS), University of British Columbia, BC, February 2022.
 - (3). Spectroscopy high-vacuum chamber (total value CDN \$200k) for use at ASPIRE and other accelerator physics projects. Acquired via the Department of Materials Sciences, University of British Columbia, Vancouver, BC, October 2024.
- (2023) Creator of the Electron Beam Ion Source (EBIS) reading group. Promote open discussions for all staff and students targeting the physics, theoretical modeling and operation of EBIS/T devices and their use as charge breeders. March 2020–June 2023.
- (2022) Scientific collaboration with the National Research Council (NRC) Metrology Group (Ottawa, ON), Isobarex Corp. (Vaughan, ON) and Public Services and Procurement Canada (PSPC) through an *Innovative Solutions Canada (ISC) Testing Stream Grant* for radioactive molecules.
- (2021) Founder of “*InventorLabs*”. Educational outreach and EDI initiative in collaboration with TRIUMF. Delivering hands-on high-quality STEAM activities for electronics, physics and chemistry to underrepresented youth and teens, and Indigenous youth, in the Greater Vancouver Area, and for youth/teens across Canada (Local and National).

(c) Memberships on Committees

- (2026) Member, Beam Physics & Delivery Department. Ongoing since Fall 2025.
- (2026) Judge and committee member, YES (Young Engineers and Scientists) Fellow program. A high-school - TRIUMF summer fellowship program (National competition).
- First participation: - spring/summer 2024.
 - Second participation: - spring/summer 2025.
 - Third participation: - spring/summer 2026.
- (2026) Member, Organizing Committee, UBC Science Rendezvous. Vancouver, BC (Local).
- First participation: - May 10, 2023.
 - Second participation: - May 10, 2024.
 - Third participation: - May 10, 2025.
 - Fourth participation: - May 7, 2026.
- (2025) Member, Hiring Committee for “Ion Source Physicist” position (Professional & Supervisory rank), March, 2025, at TRIUMF, Vancouver, BC (Local).

(2025) Head Organizer, TRIUMF-Selkirk/SIRC/STAC-UVic Ion Sources R&D Collaboration Workshop, March 27-28, 2025, at TRIUMF, Vancouver, BC (Local). Attendees: 15.

(2025) Member, Equity Diversity & Inclusion (EDI) Committee (Local).

- First participation: - 2023.
- Second participation: - 2024.
- Third participation: - 2025.

(2025) Member, Beam Delivery Planning Meetings (Local, National, International). Ongoing since 2022.

(2024) Presentations Manager & Exhibitors-Sponsors Manager, Local Organizing Committee (LOC).

- First position: - 19th International Conference on Ion Sources (ICIS'21). Conference hosted by TRIUMF, Vancouver, BC, September 20-24, 2021 (International).
- Second position: - 14th International Symposium of EBIS/T (EBIST 2022). Conference hosted by TRIUMF, Vancouver, BC, June 14-17, 2022 (International).
- Third position: - 20th International Conference on Ion Sources (ICIS'23) hosted by TRIUMF, Victoria, BC, September 2023 (International).
- Fourth position: - 20th International Conference on Electromagnetic Isotope Separators and Related Topics (EMIS XX). Conference hosted by TRIUMF, Whistler, BC, October 19-24, 2025 (International). Stepped down from LOC in 2024 fall due to competing priorities.
- Fifth position: - 20th International Conference on Electromagnetic Isotope Separators and Related Topics (EMIS XX). Conference hosted by TRIUMF, Whistler, BC, October 19-24, 2025 (International). Advisor only, Summer-Fall 2025.

(2020) Contributor, On-Line Ion Source I2 Project (commitment #372), Cyclotron Refurbishment Program.

(d) Other Service to the Laboratory

Description	Location	Date(s) of Participation	Role
Memorandum of Understanding (MOU). Between TRIUMF and the South West Research Institute (SWRI re: Dr. Dana Quasim) for collaborative research with ASPIRE.	TRIUMF, Vancouver, BC SWRI, San Antonio, TX	From August 2026 to ongoing.	TRIUMF Scientific PI
<u>Relationship building for NFRF-E grant application (international).</u> - travel to Nepal for meetings with local academics, government officials, business representatives, local community members, Elders, and Indigenous knowledge holders, to <u>build in-person understanding and relationships</u> for the proposed fieldwork of the 2027 NFRF-E grant application (see §10(c)1).	Nepal (Kathmandu & Khumbu Region of Mount Everest)	August 15-31, 2026 <u>(postponed TBD)</u>	Participant. In collaboration with <i>P. Sherpa (UBC Dept. of Critical Indigenous Studies & Dept. of Asian Studies)</i>

<u>Science Rendezvous UBC.</u> - community STEAM event for public education and outreach about TRIUMF and physics. <i>Liquid nitrogen ice cream.</i>	UBC, Vancouver, BC	e. May 7, 2026 d. May 10, 2025 c. May 10, 2024 b. May 10, 2023 a. May 7, 2022	TRIUMF Co-Organizer and Volunteer Organizer of liquid nitrogen ice cream
<u>TRIUMF ECR Program.</u> - Early Career Researcher (ECR) Mentorship Program, for upcoming young researchers.	TRIUMF, Vancouver, BC	c. Spring-Summer 2026 b. Summer-Fall 2025 a. Spring-Fall 2024	Mentor (1 on 1)
<u>Indigenous students visit (international).</u> - talk and tour of TRIUMF for Indigenous students from Wainuiomata High School in Lower Hutt (Wellington), New Zealand. To <u>build in-person understanding and relationships.</u>	TRIUMF, Vancouver, BC	June 23, 2025	TRIUMF Organizer, Speaker, and Tour Guide. In collaboration with A. Te-Punga Sommerville (UBC Dept. of English Language & Literatures)
<u>Indigenous representatives visit (international).</u> - talk and tour of TRIUMF for Indigenous government officials and business representatives from Khumbu, Nepal, in collaboration with the <i>UBC Himalaya Program</i> for the 2026 NFRF-E grant application (not awarded; see §10(c)2).	TRIUMF, Vancouver, BC	August 26, 2025 <i>Press Release:</i> https://asia.ubc.ca/news/high-level-delegation-from-nepal-visits-ubc/	TRIUMF Organizer, Speaker, and Tour Guide
<u>Cosmic Nights.</u> - community STEAM event (paid) for public education and outreach about TRIUMF, physics, accelerators. <i>Liquid nitrogen ice cream.</i>	H.R. MacMillan Space Centre (HRMSC), Vancouver, BC	e. December TBD, 2026 d. November 14, 2025 c. September 12, 2025 b. November 14, 2024 a. September 19, 2024	TRIUMF Lead Organizer, Volunteer, and Speaker (see §10d) Organizer of liquid nitrogen ice cream
<u>Staff Appreciation BBQ.</u> - for the entire TRIUMF staff and student community.	TRIUMF, Vancouver, BC	b. August 13, 2025 a. September 4, 2024	Volunteer
<u>CEDAR Visits to TRIUMF.</u> - Cross-cultural Education through Demonstration, Activity, and Recreation (CEDAR). STEAM event for student education and outreach about TRIUMF and physics. <i>Liquid nitrogen ice cream.</i>	TRIUMF, Vancouver, BC	b. July 24, 2025 a. July 24, 2024	Volunteer Organizer of liquid nitrogen ice cream

<u>Britannia Community Services Centre STEAM and Maker Jamboree.</u> - community STEAM event for public education and outreach about TRIUMF and physics. <i>Liquid nitrogen ice cream.</i>	Britannia Community Services Centre, Vancouver, BC	d. September 19, 2026 c. September 20, 2025 b. September 17, 2023 a. September 17, 2022	TRIUMF Co-Organizer and Volunteer Organizer of liquid nitrogen ice cream
<u>Trinity Western STEAM Day.</u> - community STEAM event for public education and outreach about TRIUMF and physics.	Trinity Western University, Richmond, BC	May 24, 2024	TRIUMF Co-Organizer and Volunteer
<u>University Neighbourhood Association (UNA) Day.</u> - community STEAM event for public education and outreach focused to the local UBC community about TRIUMF and physics.	Wesbrook Village, Vancouver, BC	b. September 7, 2024 a. September 7, 2019	Volunteer
<u>Country Fest.</u> - community STEAM event for public education and outreach about TRIUMF and physics.	Maple Ridge, BC	July 27 & 28, 2024 (2 days)	Volunteer

12. **SERVICE TO THE COMMUNITY**

(a) ***Editor or Co-Editor for Journal Special Issues***

(2026) Co-Editor, 15th International Beam Instrumentation Conference (IBIC), September 7-12, 2026, Liverpool, UK (International). *Pending (as of April 2026) confirmation of conference hosting.*

(2025) Co-Editor, 14th International Symposium of EBIS/T (EBIST 2022), June 14-17, 2022, Whistler, BC, Canada (International).

(b) ***Memberships on Scholarly Societies***

(2026) Canadian Institute of Nuclear Physics (CINP). <https://cinp.ca/>

(2026) Canadian Association of Physicists (CAP). <https://cap.ca/>

(2026) American Physical Society (APS). <https://www.aps.org/>

(2026/2016/2011) Meteoritical Society. <https://meteoritical.org/>

(c) ***Memberships on Committees***

(2026) Co-Organizer of Science Rendezvous. University of British Columbia, Vancouver, BC (Local).
Involvement and participation of TRIUMF at Science Rendezvous and overall organization of the event at UBC.

- First participation: - 2022.
- Second participation: - 2023.
- Third participation: - 2024.
- Fourth participation: - 2025.
- Fifth participation: - 2026.

(2018/2017) Meeting Secretary, Canadian Institute of Advanced Research (CIFAR), Deep Subsurface Science Theme, Toronto, ON, November 2018 and 2017 (International).

(2011) Co-chair for “Looking Inside” 3D Structure of Meteorites Revealed” special session, 74th meeting of the Meteoritical Society, Greenwich, UK, August 2011 (International).

(2010) Co-chair for the “Comparative Planetary Geology, Meteorites, Impacts and More” session at the GeoCanada 2010 meeting, Calgary, AB, May 2010 (International).

(d) Memberships on Other Community Committees

(2026) Mentor, Goldschmidt Conference 2026 Early Career Program, Montreal, QC (International), July 12-17, 2026 (for 2 undergraduate students: Daryana Atroshyna, Avirup Bose; see §9(c)4).
<https://conf.goldschmidt.info/goldschmidt/2026/meetingapp.cgi/ModuleMeetingInfo/MentorProgram>

(2022) Judge, Vancouver District Science Fair (VDSF), Vancouver, BC (Local). <https://blogs.vsb.bc.ca/vdsf/>
- First participation: - February 28, 2020.
- Second participation: - February 28, 2022.

(d)1 University of Toronto

Concluded

Treasurer, University of Toronto Rock Climbing Club (2011/12)
Treasurer, Graduate Students Union, CFS Local 19 (2008/9)
Director, Finance Committee, Graduate Students Union, CFS Local 19 (2008/9)
Graduate Advisor, Office of the Assistant Vice-President Student Life (2008/9)
Graduate Liason, Office of Accessibility Services (2008/9)
Board of Stewards, Hart House, voting member (2008/9)
Finance Committee, Hart House, voting member (2008/9)
Council on Student Services (COSS), voting member (2008/9)
Council on Athletics and Recreation (CAR), voting member (2008/9)
Finance Committee, Graduate Students Union, CFS Local 19 (2007/8)
Graduate Representative, Ad-Hoc Working Group on Planetary Science, Office of the Dean, Faculty of Arts & Science (2007/8)
Council Member, Graduate Students Union, CFS Local 19 (2007/8)

(d)2 Department of Earth Sciences, University of Toronto

Concluded

Treasurer, Association of Geology Graduate Students (fall 2007/9)
Graduate and Academic Affairs Committee (2007/8)
Graduate Representative, Faculty Council (2006/8)
Health and Safety Committee (2004/8)
Seminars and Planning Committee (2005/8)
President, Association of Geology Graduate Students (2006/7)
Special Events Committee (2005/7)
Director of “Rockfest” department colloquium (2005/6)
Social Committee, Association of Geology Graduate Students (2005/6)
Social Planning Committee (2004/5)

(e) Reviewer

(2014) Nuclear Instruments and Methods in Physics Research B (NIM-B).

(2011) Reviews of Scientific Instruments (RSI).

(f) Consultant

(2015) Invited columnist, Canadian Federation of Earth Scientists, May 2015.

(g) Other service to the community

(2021) Police information checked, vulnerable sector (PIC-VS), Vancouver Police Department, 2021-01-30, certificate #VA5393.

13. AWARDS, HONOURS, AND DISTINCTIONS

(a) Awards for Service & Community Leadership

(2024) Above & Beyond Award, TRIUMF, Vancouver, BC, August 2024.

(b) Awards for Teaching

(2011) Lawrence Curtis Teaching Award, University of Toronto, Department of Earth Sciences, May 2011.

(c) Awards for Scholarship

(2009/12) Ontario Graduate Scholarship in Science and Technology (OGSST), Province of Ontario and the University of Toronto, September 2009 – Summer 2012.

14. OTHER RELEVANT INFORMATION

(a) Fieldwork

(2017/18) Kidd Creek Mine, Timmins, ON. Collection of ~2 Gyr-old water and gas samples at extreme depth (7850 ft) for isotopic and chemical analysis (GC-IRMS, ICP-MS, and AMS). Participated in a total of 3 mine sampling trips.

(2018) SNO-Lab, Sudbury, ON. High-resolution gamma spectrometry at depth (6800 ft) for ID of decay products from Kidd Creek Mine waters.

(2015) Joint Ocean Ice Studies (JOIS) cruise, Canada Basin, Beaufort Sea, Arctic Ocean. Seven-week expedition aboard the heavy ice-breaker *CCGS Louis S. St-Laurent*. Collection of seawater depth samples (0-4000 m) and ice core (new, multi-year) for AMS analysis of ^{10}Be , ^{129}I , ^{135}Cs , ^{236}U , ^{244}Pu . On-ship chemistry to extract U, Pu, Cs from seawater for AMS analysis. Other science activities.

(b) Specialized Software Training

- GEANT4 – modeling isotope production by spontaneous U/Th fission and neutron capture
- FLUKA – additional Monte Carlo modeling of radionuclide production/decay
- I-GUN / E-GUN – precise field modeling of electrodes with space charge
- LORENTZ-2E – sputter-ion source modeling (no magnetic fields)
- MATLAB – general purpose data analysis and calculations
- SIMION – charged particle optics in RF and DC electric fields
- SOLIDWORKS – for 3D CAD design
- SRIM/TRIM – ion interactions with matter
- TRAK/OMNITRAK – 2D/3D particle beam modelling software with space charge

(c) Specialized Skills

- 3D X-ray Computed Tomography (CT); micro-CT techniques.
- Radioactive and stable beam production, transport.
- Particle accelerator systems.
- Accelerator mass spectrometry (AMS) for rare atom counting.
- Mass spectrometry (AMS, ID-TIMS, MC-ICP-MS [solutions, laser ablation], ICP-OES, GCxGC-IRMS).
- Ion sources (many types) including Electron Beam Ion Sources (EBIS) charge breeders.
- Custom-built mass spectrometry systems, e.g. for radioactive molecules, isobar separation.
- Gas-filled radiofrequency quadrupole (RFQ) ion guides.
- Column chromatography for radiochemical separation/purification of lanthanides, actinides.
- Cleanroom techniques (class 100) for high-precision isotope chemistry.
- Numerical simulations of particles in time dependent/independent electric and magnetic fields.
- Mechanical design for accelerator systems; machining.
- Superconducting systems; cryogenics.
- Electronics; technical issues with accelerator and mass spectrometry systems.
- Project, time management and group skills at a major Canadian National Laboratory (TRIUMF).
- Teaching, mentorship, outreach and EDI/STEAM activities.

Publications Record

SURNAME: Charles

FIRST NAME: Christopher

Initials: C. R. J.

MIDDLE NAME(S): Rudra John

Date: August 19, 2026

1. REFEREED PUBLICATIONS

(a) *In-Press*

Student co-authors or HQP under my supervision or mentorship are underlined.

- (2026) Joseph, D., **Charles, C. R. J.**, Ames, F., Schultz, B., Hassan, O., Shelbaya, O., Beale, S., Kester, O.
Toward the Creation and Detection of Molecular Beams at CANREB. NIM-B conf proc.

(b) *Submitted*

Student co-authors or HQP under my supervision or mentorship are underlined.

- (2025) Adegun, J., Shelbaya, O., **Charles, C. R. J.**, Ames, F., Jayamanna, K., Kester, O., Baartman, R. Design and Optimization of a New Extraction System for TRIUMF's Offline Supernanogan ECR Ion Source.
*Submitted to: **Nuclear Instruments and Methods in Physics Research B.***

- (2025) Simpson, R., Zulch, C., Ng, K.B., Belosevic, I., **Charles, C. R. J.**, Justus, P., Berger, R., Malbrunot-Ettenauer, S., Kwiatkowski, A.A., Reiter, M.P., Ash, J., Babcock, C., Bergmann, J., Brisley, E., Cardona, J., Chambers, C., Czihaly, A., Gottberg, A., Kakkar, S., Lassen, J., Maldonado-Milan, F., Mollaebrahimi, A., Radchenko, V., Taylor, E., Teigelhofer, A., Walls, C., Weaver, A., Weligampola, P. Formation of gaseous, doubly charged cerium monofluoride CeF_2^+ and its sensitivity to new physics.
*Submitted to: **Physical Review X.***

(c) *Journals*

Student co-authors or HQP under my supervision or mentorship are underlined.

- (2026) Warfield, B., Dehnel, M., Kester, O., **Charles, C.R.J.**, Taylor, J., Drew, C., Cramton, J., Kent, C., Savard, N., Junginger, T., Fubiani, G. A Penning Ion Source for Stable Isotope Beam Production at TRIUMF-OLIS. *Journal of Physics Conference Series* 3237, 012052.
- (2026) Clemens, N., Dufort-Gagnon, L., Irving-Hughes, A., Yuan, E., Michielan, M., Masella, O., Klassen, H., **Charles, C.R.J.**, Bazalova-Carter, M. Initial characterization of the ASPIRE $^4He^+$ ion beam using EBT4 radiochromic film and Monte Carlo simulation. *Journal of Instrumentation* 21, P04007.
- (2024) Jayamanna, K., Adegun, J., Ames, F., Angus, T., **Charles, C.R.J.**, Kiy, S., Lovera, M., Louie, D., Minato, B., Saminathan, S., Schultz, B. Dual Frequency Enhancement of the Supernanogan Multi-Charged Ion Source at TRIUMF ISAC Facility. *Journal of Physics Conference Series* 2743, 012053.
- (2024) **Charles, C.R.J.**, Cavenaile, M., Harford, P., Ames, F., Schultz, B., Kester, O. High-voltage breakdown in the injection-extraction region of the CANREB EBIS: A possible mechanism. *Journal of Physics Conference Series* 2244, 012073.
- (2024) Arrowsmith-Kron, G., Athanasakis-Kaklamanakis, M., Au, M., Ballof, J., Berger, R., Borschevsky, A., Breier, A., Budker, D., Caldwell, L., **Charles, C. R. J.**, Cirigliano, V., de Vries, J., DeMille, D., Dickel, T., Dobaczewski, J., Düllmann, C., Eliav, E., Engel, J., Fan, M., Flambaum, V., Flanagan Alyssa Gaiser, K., Garcia-Ruiz, R., Gaul, K., Giesen, T., Ginges, J., Gottberg, A., Gwinner, G., Heinke, R., Hoekstra, R., Holt, J., Hutzler, N., Jayich, A., Kartheim, J., Malbrunot-Ettenauer, S., Miyagi, T., Moore, I., Navrátil, P., Nazarewicz, W., Neyens, G., Norrgard, E., Nusgart, N., Pašteka, L., Plass, W., Ready, R., Pascal Reiter, M., Reponen, M., Rothe, S., Safronova, M., Scheidenberger, C., Shindler, A., Singh, J., Skipnikov, L.

Udrescu, S., Wilkins, S. Opportunities for Fundamental Physics Research with Radioactive Molecules. *Reports on Progress in Physics* 87, 8, 084301.

- (2024) Saminathan, S., Ames, F., Angus, T., Baartman, R., **Charles, C. R. J.**, Cho, J., Dirksen, P., Hruskovec, T., Jayamanna, K., Lovera, M., Marchetto, M., Minato, B., Schultz, B., Wager, Design and commissioning of a versatile surface ion source. *Journal of Physics Conference Series* 2743, 012079.
- (2024) Justus, P., **Charles, C. R. J.**, Ames, F., Jayamanna K., Malbrunot-Ettanauer, S. Creation and characterization of multi-charged cerium beams at TRIUMF's OLIS. *Journal of Physics Conference Series* 2743, 012055.
- (2024) Laxdal, A., Joseph, D.R., Ames, F., Babcock, C., **Charles, C. R. J.**, Cheal, B., Day Goodacre, T., Hamilton, C.C., Gottberg, A., Kunz, P., Lassen, J., Pearson, M.R., Raymonds, K., Schmidt, A., Wolsky, A. Development of an Optical Method for Temperature Measurements of the ISAC Targets at TRIUMF. *Nuclear Instruments and Methods in Physics Research B* 546, 165156.
- (2022) Schultz, B., **Charles, C. R. J.**, Cavenaile, M., Kanungo, R., Ames, F., Kester, O. CANREB EBIS comissioning at TRIUMF. *Journal of Physics Conference Series* 2244, 012028.
- (2022) **Charles, C. R. J.**, Ames, F., Kester, O., Malbrunot-Ettanuer, S., Babcock, C., Schultz, B.E., Peters, C., Flannigan, E.L., Alary, J-F., Laxdal, A., Kunz, P., Lassen, J., Teigelhoefer, A., McCausland, P.J.A., Flemming R. Production of Radioactive Molecular Ions in Radiofrequency Quadrupole Gas-Reaction Cells. *Journal of Physics Conference Series* 2244, 012100.
- (2022) Alary, J-F., Cousins, L.M., Javahery, R., Kieser, W.E., Flannigan, E.L., **Charles, C.** Dynamics and reactivity of thermalized ions in a radiofrequency quadrupole gas-reaction cell used in the production of radioactive molecular ions. *Journal of Physics Conference Series* 2244, 012107.
- (2020) **Charles, C. R. J.**, McCausland, P.J.A., Davis, D.W. LA-ICP-MS Pb isotope test of meteorite provenance: A Terrestrial Origin for Lovina. *Meteoritics and Planetary Science. Meteoritics and Planetary Science* 55(5), 1093-1102.
- (2019) Kazi, Z.H., **Charles, C. R. J.**, Zhao, X.L., Cornett, R.J., Kieser, W.E. Ion beam enhancement in ²³⁶UO measurement by AMS using Si powder as the binder. *Nuclear Instruments and Methods in Physics Research B* 456, 218-221.
- (2018) **Charles, C. R. J.**, Robin, P.Y., McCausland, P.J.A., Davis, D.W. Shapes of Chondrules Determined from the Petrofabric of the CR2 chondrite NWA 801. *Meteoritics and Planetary Science* 53, 935-951.
- (2016) Xhao, X.-L., **Charles, C. R. J.**, Cornett, R.J., Kieser, W.E., MacDonald, C., Kazi, Z., St.-Jean, N. An exploratory study of recycled sputtering and CsF₂ current enhacement for AMS. *Nuclear Instruments and Methods in Physics Research B* 366(1), 96-103.
- (2016) Sookdeo, A., Cornett, J., Zhao, X.L., **Charles, C. R. J.**, Kieser, W.E. Quantifying ²¹⁰Pb by Accelerator Mass Spectrometry: A study of molecular and isobaric interferences of ²⁰⁴,²⁰⁵,²⁰⁸Pb and ²¹⁰Pb. *Rapid Communications in Mass Spectrometry* 30(7), 867-872.
- (2015) **Charles, C. R. J.**, Cornett, R.J., Zhao, X.-L., Litherland, A.E., Kieser, W.E. On-line I-/Te- separation for the AMS analysis of ¹²⁵I. *Nuclear Instruments and Methods in Physics Research B* 361, 189-192.
- (2015) MacDonald, C., **Charles, C. R. J.**, Cornett, J., Zhao, X.L., Kieser, W.E., Litherland, A.E. Detection of ¹³⁵Cs by Accelerator Mass Spectrometry. *Rapid Communications in Mass Spectrometry* 29, 115-8.
- (2015) Robin, P.Y. and **Charles, C. R. J.** Quantifying the three-dimensional shapes of spheroidal objects in rocks imaged by tomography. *Journal of Structural Geology* 77, 1-10.

- (2015) Cornett, R.J., Kazi, Z.H., Zhao, X.-L., Chartrand, M.G. **Charles, C. R. J.**, and Kieser, W.E. Actinide measurements by AMS using fluoride matrices. *Nuclear Instruments and Methods in Physics Research B* 361, 317-321.
- (2015) Alary, J.F., Gholamreza, J., Kieser, W.E., Zhao, X.-L., Litherland, A.E., Cousins, L. and **Charles, C. R. J.** Isobar Separator for Anions: Current Status. *Nuclear Instruments and Methods in Physics Research B* 361, 197-200.
- (2013) Zhao, X.L., Eliades, J., Litherland, A.E., Kieser, W.E., Cornett, J., **Charles, C. R. J.** On-line HfF5/WF5 separation in an O₂-filled RFQ gas cell. *Rapid Communications in Mass Spectrometry* 27(24), 2818-2822.
- (2011) **Charles, C. R. J.** Disaggregating Meteorites by Automated Freeze Thaw. *Review of Scientific Instruments* 82(6), 1-6.
- (2006) **Charles, C. R. J.**, Khan, Z.S. and Morris, S.W. Pattern Scaling in Axial Segregation. *Granular Matter* 8(1), 1-3.

(d) Conference Proceedings (Chosen by Peer Review)

Student co-authors or HQP under my supervision or mentorship are underlined.

- (2026) Klassen, H., Beale, S., **Charles, C. R. J.**, *An Extensible Reaction-Diffusion Solver for Radiolysis and Astroparticle Physics*. Canadian Undergraduate Physics Conference (CUPC 2026), in-person Oral Presentation, Hamilton (McMaster University), ON, Canada, October 15 - 18, 2026 (National).
- (2026) Klassen, H., Beale, S., **Charles, C. R. J.**, *An Extensible Reaction-Diffusion Solver for Radiolysis and Astroparticle Physics*. Canadian Astroparticle physics Summer Student Talk (CASST 2026) symposium, in-person Oral Presentation, Sudbury (Laurentian University), ON, Canada, August 12-13, 2026 (National).
- (2026) Clemens, N., Dufort-Gagnon, L., Irving-Hughes, A., Yuan, E., Michielan, M., Masella, O., **Charles, C. R. J.**, Bazalova-Carter, M., *Initial dosimetry and characterization of the ASPIRE 4He⁺ ion beam using EBT4 radiochromic film and Monte Carlo Simulation*. Joint Canadian Organization of Medical Physicists | American Association of Physicists in Medicine Meeting (AAPM | COMP 2026), in-person Poster Presentation, Vancouver, BC, Canada, July 19 - 22, 2026 (International).
- (2026) Griffin, C., **Charles, C. R. J.**, Kester, O., Katrusiak, A., Hassan, O., Ames, F. *ECR ion sources at TRIUMF: status and future developments*. 27th International Workshop on ECR Ion Sources (ECRIS'26), in-person Poster Presentation, San Francisco, USA, September 27 - October 1, 2026 (International).
- (2026) Katrusiak, A., Kester, O., **Charles, C. R. J.**, Griffin, C., Hassan, O., Adegun, J. *Preparations for brightness increase of the Supernogan ECRIS at TRIUMF's ISAC Facility using machine learning*. 27th International Workshop on ECR Ion Sources (ECRIS'26), in-person Poster Presentation, San Francisco, USA, September 27 - October 1, 2026 (International).
- (2026) Ismagilova, S., Cardona, J., **Charles, C. R. J.**, Dehghan, M., Hartmann, M., Kester, O., Kwiatkowski, A., Schultz, B. *Troubleshooting the Next-Generation High-Power Electron Gun for Re-Accelerated Beam Production at TRIUMF*. Annual Workshop on Ion and Particle Beams 2026, in-person Poster Presentation, Munich, Germany, June 15 - 16, 2026 (International).
- (2026) **Charles, C. R. J.**, Klassen, H., Yuan, E., Irving-Hughes, A., Michielan, M., Schaller, M., Cooke, I., Qasim, D.N., Mattie, J., Ames, F., Pearson, A., DeLazzari, C., Griffin, C.J., Beale, S., Beaumier-Martin, C., Schultz, B., Ismagilova, S., Spagnut, L., Hartmann, M., Sherpa, P., Logan, T., Clemens, N., Dufort-Gagnon, L., Bazalova-Carter, M., Applin, D., Cloutis, E., Dehnel, M., Taylor, J., Cramton, J., Drew, C., Haertel, B., Enkelmann, E., Flemming, R.L., McCausland, P.J.A., Smith, N.T.J., Kester, O.

Planetary and Anthropogenic Material Irradiations with Accelerated Beams at ASPIRE-TRIUMF.
Goldschmidt, in-person Oral Presentation, Montreal, Canada, July 2026 (International).

- (2026) Beale, S., **Charles, C. R. J.**, Marrone, T., Andreoiu, C., Warr, O., Klassen, H., Smith, N.J.T. *Investigations of Nitrogen Cycling in Ancient Subsurface Fluids.* Goldschmidt, in-person Oral Presentation, Montreal, Canada, July 2026 (International).
- (2026) Giannotti, D., **Charles, C. R. J.**, Gregory, D. *Groundwork for the Preparation of a New Batch of 205Pb for Use in Precision Spikes.* Goldschmidt, in-person Oral Presentation, Montreal, Canada, July 2026 (International).
- (2026) Hartmann, M., Ames, F., Cardona, J., **Charles, C. R. J.**, Dehghan, M., Good, M., Ismagilova, S., Kester, O., Kwiatkowski, A., Schultz, B. *Finite Element Studies of the CANREB Electron Gun for a Test Stand Setup.* 17th International Particle Accelerator Conference (IPAC26), in-person Oral Presentation, Deauville, FR, May 2026 (International).
- (2025) Yuan, E., Irving-Hughes, A., Michielan, M., Klassen, H., Joseph, D., Beale, S., Huan, T., Qasim, D., **Charles, C.** and Cooke, I. *Cosmic ray bombardment of icy troilite (FeS).* Workshop on Interstellar Matter 2025, Hokkaido University, Japan, in-person Oral Presentation, Hokkaido, JP, November 2025 (International).
- (2025) **Charles, C. R. J.**, Ames, F., Schultz, B., Kester, O. *Long-Lived Radioactive Beam Upgrade at TRIUMF ISAC.* 21st International Conference on Ion Sources (ICIS 2025), Oxford, UK, in-person Oral Presentation, Victoria, BC, September 2025 (International).
- (2025) Warfield, B., **Charles, C. R. J.**, Ames, F., Kester, O., Junginger, T. *A Penning Ion Source for Stable Isotope Beam Production at TRIUMF-OLIS.* 21st International Conference on Ion Sources (ICIS 2025), Oxford, UK, in-person Oral Presentation, Victoria, BC, September 2025 (International).
- (2025) Yuan, E., Irving-Hughes, A., Klassen, H., Joseph, D., Beale, S., Haertel, B., Enkelmann, E., Quasim, D., **Charles, C. R. J.**, Cooke, I. *A New Experimental System for Energetic Processing of Interstellar Sulfur-Containing Icy Dust Grains.* 78th International Symposium on Molecular Spectroscopy (ISMS), Champaign, Illinois, USA, in-person Oral Presentation, Urbana-Champaign, June 2025 (International).
- (2025) Joseph, D., **Charles, C. R. J.**, Ames, F., Schultz, B., Hassan, O., Shelbaya, O., Beale, S., Kester, O. *Toward the Creation and Detection of Molecular Beams at CANREB.* 20th International Conference on Electromagnetic Isotope Separators and Related Topics (EMIS XX), Whistler, Canada, in-person Poster Presentation, Whistler, BC, October 2025 (International).
- (2025) Hartmann, M., Hassan, O., Ames, F., **Charles, C. R. J.**, Joseph, D., Kester, O., Saminathan, S., Schultz, B., Shelbaya, O. *Beam optics and FEA simulations of the CANREB beamline at TRIUMF.* 20th International Conference on Electromagnetic Isotope Separators and Related Topics (EMIS XX), Whistler, Canada, in-person Poster Presentation, Whistler, BC, September 2025 (International).
- (2025) Yuan, E., Irving-Hughes, A., Michielan, M., Klassen, H., Joseph, D., Beale, S., Pearson, A., Huan, T., Qasim, D., **Charles, C. R. J.**, Cooke, I. *Energetic processing of sulfur-containing icy dust grains in the interstellar medium.* Pacifichem 2025, Honolulu, Hawaii, USA, in-person Oral Presentation, December 2025 (International).
- (2025) Yuan, E., Irving-Hughes, A., Klassen, H., Joseph, D., Pearson, A., Huan, T., Qasim, D., **Charles, C. R. J.**, Cooke, I. *Energetic processing of sulfur-containing icy dust grains in the interstellar medium.* American Chemical Society (ACS) Spring 2025 Meeting, San Diego, CA, USA, in-person Poster Presentation, March 2025 (International).

- (2025) **Charles, C. R. J.**, Klassen, H., Pearson, A., Haertel, B., Enkelmann, E., Yuan, E., Irving-Hughes, A., Cooke, I., Beale, S., Flemming, R.L., McCausland, P.J.A., Ames, F., Smith, N.J.T., Kester, O. *The Astrochemical and Planetary Materials Irradiation Experiment (ASPIRE) at TRIUMF*. 56th Lunar and Planetary Science Conference (LPSC), Woodlands, TX, USA, in-person Poster Presentation, March 2025 (International).
- (2024) Ames, F., Adegun, J., **Charles, C. R. J.**, Jayamanna, K., Kester, O., Schultz, B. *ECRIS operation and developments at TRIUMF*. 26th International Workshop on ECR Ion Sources, Darmstadt, Germany, in-person Oral Presentation, September 2024 (International).
- (2024) Schultz, B., Cavenaile, M., **Charles, C. R. J.**, Ames, F., K., Kester, O. *CANREB EBIS Development at TRIUMF*. 15th International Symposium on Electron Beam Ion Sources and Traps (EBIST 2024), Kielce, Poland, in-person Oral Presentation, August 2024 (International).
- (2023) Cavenaile, M., Schultz, B., Ames, F., **Charles, C. R. J.**, Kester, O., Kanungo, R. *Pulse Stretching Out of the CANREB EBIS*. 20th International Conference on Ion Sources (ICIS 2023), Victoria, Canada, in-person Poster Presentation, Victoria, BC, September 2023 (International).
- (2023) Jayamanna, K., Adegun, J., Ames, F., Angus, T., **Charles, C. R. J.**, Kiy, S., Lovera, M., Minato, B., Saminathan, S., Schultz, B. *Dual Frequency Enhancement of the SuperNanogan Multi-Charged Ion Source at TRIUMF ISAC Facility*. 20th International Conference on Ion Sources (ICIS 2023), Victoria, Canada, in-person Poster Presentation, Victoria, BC, September 2023 (International).
- (2023) **Charles, C. R. J.**, Cavenaile, M., Ames, F., Kester, O., Schultz, B. *Discharge in the Trumpet Regions of the CANREB EBIS*. 20th International Conference on Ion Sources (ICIS 2023), Victoria, Canada, in-person Poster Presentation, Victoria, BC, September 2023 (International).
- (2023) **Charles, C. R. J.**, Lovera, M., Hamilton, C., Currie, B., Pysklywec, M., Shalbaya, O., Jayamanna, K., Ames, F., Kiy, S., Angus, T., Minato, B. *Multi-Charged Phosphorus and Cesium Beams at the OLIS Facility at TRIUMF*. 20th International Conference on Ion Sources (ICIS 2023), Victoria, Canada, in-person Poster Presentation, Victoria, BC, September 2023 (International).
- (2023) Justus, P., **Charles, C. R. J.**, Malbrunot, S., Jayamanna, K., Ames, F. *Creation and Characterisation of Multi-Charged Cerium Beams at the TRIUMF OLIS Facility*. 20th International Conference on Ion Sources (ICIS 2023), Victoria, Canada, in-person Poster Presentation, Victoria, BC, September 2023 (International).
- (2023) Saminathan, S., Marchetto, M., Schultz, B., Lovera, M., Wager, D., Jayamanna, K., Ames, F., **Charles, C. R. J.**, Baartman, R., Cho, J., Hruskovec, T., Dirksen, P., Angus, T., Minato, B. *Design and commissioning of a versatile surface ion source*. 20th International Conference on Ion Sources (ICIS 2023), Victoria, Canada, in-person Poster Presentation, Victoria, BC, September 2023 (International).
- (2023) Schultz, B., Kester, O., Ames, F., **Charles, C. R. J.**, Cavenaile, M. Status of the CANREB EBIS at TRIUMF. 20th International Conference on Ion Sources (ICIS 2023), Victoria, Canada, in-person Poster Presentation, Victoria, BC, September 2023 (International).
- (2022) **Charles, C. R. J.**, Cavenaile, M., Ames, F., Schultz, B. *Simulations of the CANREB EBIS: Where might the issue(s) be?* 14th International Symposium of EBIS/T (EBIST2022), in-person Oral Presentation, Whistler, BC, June 2022 (International).
- (2022) Schultz, B., **Charles, C. R. J.**, Ames, F., Cavenaile, M., Beale, S., Schultz, B., Kester, O. *Status of the CANREB EBIS at TRIUMF*. 14th International Symposium of EBIS/T (EBIST2022), in-person Oral Presentation, Whistler, BC, June 2022 (International).

- (2022) Cavenaille, M., Ames, F., Kanungo, R., **Charles, C. R. J.**, Schultz, B., Kester, O. *Pulse Stretching out of the CANREB EBIS*. 14th International Symposium of EBIS/T (EBIST2022), in-person Oral Presentation, Whistler, BC, June 2022 (International).
- (2022) Laxdal, A., Joseph, D., Kunz, P., Pearson, M.R., Cheal, B., Wolski, A., **Charles, C. R. J.**, Ames, F., Lassen, J. *Development of direct on-line temperature measurements of ISAC targets at TRIUMF*. 19th International Conference on Electromagnetic Isotope Separators and Related Topics (EMIS 2022 at RAON), in-person Oral Presentation, Daejeon, South Korea, October 2022 (International).
- (2021) Cavenaille, M., Ames, F., Kanungo, R., **Charles, C. R. J.**, Schultz, B., Kester, O. *Pulse Stretching out of the CANREB EBIS*. 19th International Conference on Ion Sources – ICIS'21, online due to COVID-19, September 2021 (International).
- (2021) **Charles, C. R. J.**, Cavenaille, M., Harford, P., Schultz, B., Ames, F., Kester, O. *Simulations of the Electron Beam Ion Source (EBIS) at CANREB*. 19th International Conference on Ion Sources – ICIS'21, online due to COVID-19, September 2021 (International).
- (2021) **Charles, C. R. J.**, Malbrunot, S., Ames, F., Kester, O., Flannigan, E., Alary, J.-F., Laxdal, A., Kunz, P., McCausland, P.J.A., Flemming, R., Teigelhoefer, A. *Production of Radioactive Molecular Ions in a Radiofrequency Quadrupole Gas-Reaction Cell*. 19th International Conference on Ion Sources – ICIS'21, online due to COVID-19, September 2021 (International).
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- (2016) Zhao, X.L., MacDonald, C., Cornett, J., Kieser, W.E., **Charles, C. R. J.** *CaF_3/KF_3 on-line separation methods and the present $^{41}\text{Ca}/\text{Ca}$ sensitivity at AEL-AMS*. Oral Presentation. Canadian Association of Physicists (CAP), Ottawa, Canada, June 2016 (National).
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- (2015) **Charles, C. R. J.**, Davis, D.W., McCausland, P.J.A. and Robin, P.Y. *Nebular Conditions in the Early Solar System from the 3D Tomography of Chondrules*. Oral Presentation. Joint Annual Meeting of the Geological Association of Canada and Mineralogical Association of Canada (GAC-MAC), Montreal, May 2015 (National).
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- (2010) **Charles, C. R. J.** and Davis, D. W. *Lead Isotope Age of Chondrules in the CR2 Chondrite NWA801 by Progressive Stepwise Dissolution*. Oral Presentation. GeoCanada - Working with the Earth, Calgary, AB, April 2010 (International).
- (2010) **Charles, C. R. J.** and Davis, D. W. *Lead Isotope Investigation of the Tagish Lake Carbonaceous Chondrite*. Poster Presentation. GeoCanada - Working with the Earth, Calgary, AB, April 2010 (International).
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- (2004) **Charles, C. R. J.**, Khan, Z. S., Morris, S. W. *Pattern scaling in axial segregation*. Oral Presentation. American Physical Society, Montreal, QC, March 2004 (International).

(e) Other Refereed or Reviewed Work

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- (2026) **Charles, C. R. J.**, internal TRIUMF Document-258236, OLIS Chemical Inventory List (updated).
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- (2026) **Charles, C. R. J.**, internal TRIUMF Document-256115, Design Note: OLIS Roadmap (2026 onwards).
- (2025) **Charles, C. R. J.**, internal TRIUMF Document-250569, ASPIRE BPR (Cosmic Ray Irradiation Chemistry of Frozen Interstellar Grains at ASPIRE).
- (2025) **Charles, C. R. J.**, internal TRIUMF Document-, ASPIRE Pre-Beamtime Meeting, Sched. 148, July 2025.
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- (2025) **Charles, C. R. J.**, internal TRIUMF Document-, ASPIRE Safety Report, Sched. 148, September 2025.
- (2025) **Charles, C. R. J.**, internal TRIUMF Document-249428, ASPIRE BPR (Cosmic Ray Irradiation Chemistry of Frozen Interstellar Grains).

- (2024) **Charles, C. R. J.**, internal TRIUMF Document-242776, ASPIRE Hazard Analysis Safety Meeting Minutes.
- (2024) **Charles, C. R. J.**, internal TRIUMF Document-240982, ASPIRE (ASP1) Hazard Analysis.
- (2024) **Charles, C. R. J.**, internal TRIUMF Document-243070, ASPIRE Integration & Test Plan Commissioning.
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- (2024) **Charles, C. R. J.**, internal TRIUMF Document-, ASPIRE Pre-Experiment Briefing, August 2024.
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- (2024) **Charles, C. R. J.**, internal TRIUMF Document-, ASPIRE Safety Report, October 2024.
- (2024) **Charles, C. R. J.**, internal TRIUMF Document-243230, ASPIRE BPR (Irradiation of Natural Apatite for Fission-Track Age Dating Enhancement).
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- (2024) **Charles, C. R. J.**, internal TRIUMF Document-240815, ASPIRE Vacuum Interlocks Specifications.
- (2023) **Charles, C. R. J.**, internal TRIUMF Document-161910, Stable Ion Sources Group Manual.
- (2020) **Charles, C. R. J.**, Ames, F., Jayamanna, K., Kunz, P., Lassen, J., Pearson, M., Schultz, B., Teigelhoefer, A., Behr, J., Dilling, J., Kwiatowski, A., Alary, J.-F., Cousins, L., Javahery, R., Kieser, W.E., Litherland, A.E., McCausland, P.J.A., Flemming, R.L., Douglas, D., internal TRIUMF Document-192806. "Production of radioactive molecules (RAM) in an RFQ ion guide and gas-reaction cell". Project Initiation Sheet (PRIS) for radioactive molecule project.

2. **NON-REFEREED PUBLICATIONS**

(a) Journals

Student co-authors or HQP under my supervision or mentorship are underlined.

- (2025) Planche, T., Kester, O., Laxdal, R., Gottberg, A., Junginger, T., Lassen, J., **Charles, C. R. J.**, Rao, Y.-N., Leewe, R., Kunz, P., Verzilov, V. Development of Enabling Accelerator Technologies. Canadian Subatomic Physics (SAP) Long Range Plan (2027–2034), Canadian Institute of Nuclear Physics (CINP).

(b) Conference Proceedings

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- (2026) McLaughlin, E., Griffin, C., **Charles, C. R. J.**, Alcorta, M., 2026 YES! Fellowship: Building Beam Loss Monitors for ARIEL at TRIUMF. Summer 2026 Undergraduate Co-op Poster Presentation Event, in-person Poster Presentation, Vancouver (TRIUMF), BC, Canada, August 12, 2026 (Local).

- (2026) Klassen, H., Beale, S., **Charles, C. R. J.**, *An Extensible Reaction-Diffusion Solver for Radiolysis and Astroparticle Physics*. Summer 2026 Undergraduate Co-op Poster Presentation Event, in-person Poster Presentation, Vancouver (TRIUMF), BC, Canada, August 12, 2026 (Local).
- (2026) Ismagilova, S., Cardona, J., **Charles, C. R. J.**, Dehghan, M., Hartmann, M., Kester, O., Kwiatkowski, A., Schultz, B. *Troubleshooting the Next-Generation High-Power Electron Gun for Re-Accelerated Beam Production at TRIUMF*. ARIEL Science Workshop 2026, in-person Poster Presentation, Vancouver, BC, April 2026 (International).
- (2026) **Charles, C. R. J.** *Irradiation Environments of Early Solar System Protoplanetary Disks & Meteorites at ASPIRE-ARIEL*. ARIEL Science Workshop 2026, in-person Poster Presentation, Vancouver, BC, April 2026 (International).
- (2019) Harford, P. and **Charles, C. R. J.**, *Repair and Re-Design of the CANREB Electron Beam Ion Source (EBIS)*. Oral Presentation. 7th Annual TRIUMF Fall Student Symposium, Vancouver, Canada, December 2019 (National).
- (2009) **Charles, C. R. J.** and Davis, D. W. *Novel approaches to isotopic analyses of meteorites*. Oral Presentation. Planetary Science Research Symposium, Astromaterials Discipline Working Group, Canadian Space Agency, Toronto, ON, October 2009 (International).
- (2007) **Charles, C. R. J.**, McCausland, P. J. A., Nicklin, I., Flemming, R. W., Davis, D. W. *A micro-XRD survey of potential CAIs in the Tagish Lake Chondrite (P2 ROM)*. Poster Presentation. Kobe International School of Planetary Science, Kobe, Japan, July 2007 (International).
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(c) Other

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- (2011) Anders, D., **Charles, C.**, Das, A., Dobson, A., Olsen, K., and Ye, Q. Proposal for the NEAR- IEX Asteroid Sample Return Mission. *Paper for the Planetary Science Short Course* at University of Western Ontario, London, ON, September 30, 2011.
- (2006) **Charles, C. R. J.** On the Fractionation of Odd versus Even Uranium Isotopes. *Report for completion of the Master of Science Degree*, Department of Geology, University of Toronto, January 2006.

3. BOOKS

(a) Authored

(b) Edited

(c) Chapters

4. PATENTS

5. SPECIAL COPYRIGHTS

6. ARTISTIC WORKS, PERFORMANCES, DESIGNS

7. OTHER WORKS

8. WORK IN PROGRESS (including degree of completion)

Student co-authors or HQP under my supervision or mentorship are underlined.

Charles, C. R. J., Ames, F., O., Kester, O. A New Sample Irradiation Facility at TRIUMF ISAC. To be submitted to *Nuclear Instruments and Methods in Physics Research A or B* (30% completion).

Charles, C. R. J., et al (authors to be determined). ^{31}P and ^{133}Cs Beams from the TRIUMF Off-Line Ion Source for Nuclear Astrophysics Studies. To be submitted to *Nuclear Instruments and Methods in Physics Research A or B* (5% completion).

Charles, C. R. J., Peters, C., Pysklywec, M., Harford P., Ames, F., Lassen, J., Kunz, P., Alary, J.F., Kester, O. A Radiofrequency Quadrupole Gas-Cell for the Production of Radioactive Molecules. To be submitted to *Nuclear Instruments and Methods in Physics Research A or B* (20% completion).

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Charles, C. R. J., Kazi, Z., Cornett, J., MacDonald, C., Francisco, B., Grinter, M., Zhao, X.L., Rowan, D. Measurement of ^{236}U in Biota by accelerator mass spectrometry. To be submitted to *Rapid Communications in Mass Spectrometry* (70% completion).

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Charles, C. R. J. and Davis, D.W. Adjustment of the Initial Mg Composition from ^{26}Al Systematics in the Solar Nebula from $^{207}\text{Pb}/^{206}\text{Pb}$ Chronometry of CAIs and Chondrules. To be submitted to *Meteoritics & Planetary Sciences* (90% completion).

Currie, B., **Charles, C. R. J.**, Laxdal, A., Flemming, R., et al (to be finalized). Simulations of ^{36}Cl , ^{129}I and ^{236}U Systematics in Deep Subsurface Waters. Possible submission to *Geochimica et Cosmochimica Acta* (10% completion).

Deng, M., McCausland, P.J.A., **Charles, C. R. J.**, Umoh, J., Holdsworth, D. In situ chondrule shapes in the Tagish Lake C2 (ungrouped) carbonaceous chondrite: A window on the formation of chondrules in the solar nebula. To be submitted to *Meteoritics and Planetary Science* (85% completion).

Henders, M., Sadowski, E., Spooner, C., Xing, B., **Charles, C. R. J.** Distributed Control of Small-to-Medium Scale Experiments at TRIUMF using and EPICS Raspberry-Pi Cluster. To be submitted to the *Journal of Computer and Systems Sciences International* (25% completion).

Harford, P., **Charles, C. R. J.**, Cavenaile, M., Ames, F., Schultz, B., Peters, C., Kester, O. Ion Motion in the CANREB RFQ Cooler-Buncher. To be submitted to *Nuclear Instruments and Methods in Physics Research A or B* (40% completion).

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Minato, B., Lovera, M., Sytchougova, T., **Charles, C. R. J.**, Jayamana, K., Ames, F. Upgrade of the OLIS beam transport system at TRIUMF. To be submitted to *Reviews of Scientific Instruments* (75% completion).

Peters, C., Harford, P., **Charles, C. R. J.**, Pysklywec, M., Ames, F., Cavenaile, M. Optimization of Charged Particle Simulations for Radiofrequency Quadrupole Gas-Cells. To be submitted to *Physics Letters B or NIM-B* (10% completion).