Canadian Institute of Nuclear Physics
Institut canadien de physique nucléaire

Newsletter #27, December 2025

The Canadian Institute of Nuclear Physics (CINP) is a formal organization of the Canadian nuclear physics research community to promote excellence in nuclear research and education, and to advocate the interests and goals of the community both domestically and abroad.

1. SAPES Fall Context Meeting

CINP has been asked to make a presentation to SAPES during their Fall Context session on Dec 18, 2025. The purpose of the session is to update and familiarize the SAPES about the SAP Canadian funding and research landscape, prior to their review of this year's applications. The CINP presentation is in addition to the Context Document we are currently updating.

Our usual practice is to brief SAPES on the major activities undertaken by the CINP in supporting Canadian subatomic physics research endeavors, and present some slides on the breadth of Canadian nuclear physics research and important current and future priorities. The CINP presentation will be 15 minutes long, leaving time for questions.

If you have something to contribute, such as:

- a major research award or recognition received,
- a recent research highlight, such as a publication in a prestigious journal,
- approval or commissioning of a new research capability or technique,

please let Garth Huber know ASAP, and preferably no later than December 8, so he can send you an example slide using the CINP PPT template. The template is required so that the CINP presentation is visually coherent and professional in appearance.

For your reference, copies of past presentations to SAPES are at: https://cinp.ca/nuclear-physics
The subatomic physics research context document is at: https://cinp.ca/cinp-white-papers

Garth's contact information is on the back page of this newsletter.

2. Canadian Subatomic Physics Long Range Plan 2027-2034

The Canadian Subatomic Physics Long Range Plan process is underway, with the period covered from 2027 – 2034 and an outlook to 2041. The Long Range Plan Committee (LRPC) has been formed, and is composed of (voting members):

- Torben Ferber, Karlsruhe: Experimental particle physics
- Alfredo Galindo-Uribarri, Oak Ridge National Laboratory: Experimental low-energy nuclear and neutrino physics
- Darren Grant, Simon Fraser: Experimental astroparticle and high-energy neutrino physics
- David Hornidge, Mount Allison: Experimental medium-energy nuclear physics
- Katelin Schutz, McGill: Theoretical astroparticle BSM physics
- Hirohisa Tanaka, Standford: Experimental neutrino physics
- Nicole Vassh, TRIUMF: Theoretical nuclear astrophysics
- Simon Viel, Carleton: Experimental astroparticle and dark matter physics
- Alison Lister (Co-Chair), U. British Columbia: Experimental high-energy physics
- Paul Garrett (Co-Chair), Guelph: Experimental low-energy nuclear physics

with non-voting members:

- Carsten Krauss, Alberta: IPP Director
- Garth Huber, Regina: CINP Executive Director

- Rituparna Kanungo, TRIUMF: SAPES Co-Chair
- Maria Chamizo-Llatas, Berkeley National Laboratory, SAPES Co-Chair
- Kevin Lapointe, NSERC: SAPES Program Manager
- Sarah Overington, NSERC: Director Discovery, Research and Recognition
- Olivier Gagnon, CFI: Subatomic Physics Associate Director of Innovation and Special Funds
- Mark Lagace, CFI: Director of Programs

and Ex-Offico members:
- Nigel Smith, TRIUMF: Director
- Jodi Cooley, SNOLAB: Director
- Tony Noble, McDonald Institute: Director
- Marcela Carena, Perimeter Institute: Director

The LPRC has received the CINP report "The 2027-2034 Vision for Nuclear Physics in Canada", and the "IPP Brief to the 2025-2026 Long Range Planning Committee". Projects not covered in either the CINP or IPP reports, or where there have been substantial updates, may submit documents directly to the Co-Chairs for distribution to the LRPC; please contact us regarding format.

The LRPC will conduct a survey to collect information directly from the broader community, and we seek input from all active members of the SAP community, including research associates and graduate students. We anticipate that the survey will be circulated early in 2026.

We anticipate a series of focused Town Hall meetings as the LRPC digests the information contained in the CINP and IPP reports. More information about these meetings will be communicated once topics, dates, and format as been set. A comprehensive community town hall meeting will follow in late spring 2026.

General information about the previous Canadian Subatomic Physics Long Range Planning process can be found at http://www.SubatomicPhysics.ca, including the past reports covering 2022 – 2026, 2017 – 2021, 2011 – 2016, and 2006 – 2016.

Should you have any questions or comments, please feel free to contact us directly at
mailto:alister@phas.ubc.ca
mailto:pgarrett@physics.uoguelph.ca
Alison Lister (UBC) and Paul Garrett (Guelph)
Co-Chairs, Canadian SAP LRPC

3. Representation and Input to Various Agencies

The CINP is an advocate and representative of the Canadian nuclear physics community and is asked to attend various meetings or make presentations on its behalf. Some recent and forthcoming activities include:

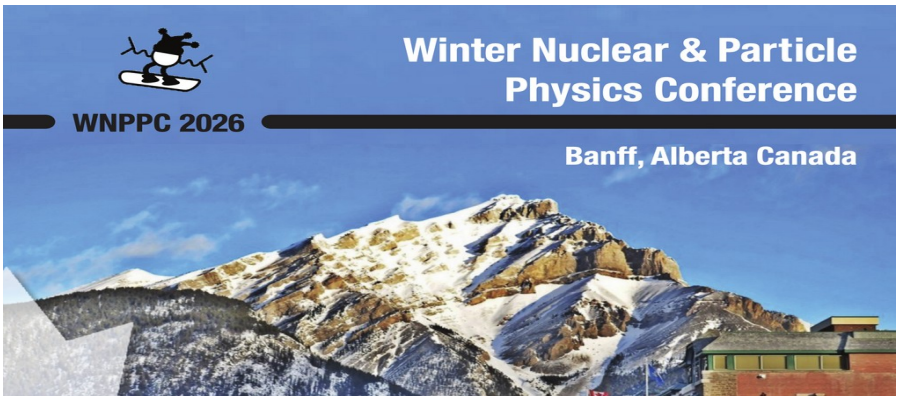
- **GH and the IPP Director, Carsten Krauss, will travel to Ottawa on December 8-9 for in-person meetings with federal science funding agencies on matters of direct relevance to funding for Subatomic Physics Research.** We have meetings scheduled with:
  - NSERC President Alejandro Adem
  - CFI Director Marc Legace
  - ISED Director General Michelle Gravelle

It is extremely important for the science community to engage with the federal and provincial governments on the importance of science funding. We encourage you to similarly reach out to your MP or provincial representative.

- GH represents CINP on the Pan-Canadian MRS Coordination Board, which is a national oversight board for all SAP-MRS resources. They meet ~6 times a year to discuss MRS resource requests and the progress of each center on the assigned SAP projects.

For more information on the available MRS resources, please visit the CINP website https://cinp.ca/subatomic-physics-major-resources-support-facilities

The MRS Coordination Board also made a presentation at the last CINP Individual Members meeting, the slides are available from: https://cinp.ca/agm-slides



4. Winter Nuclear and Particle Physics Conference (WNPPC 2026)

(submitted by Heather Russell, UVic)

Registration and abstract submission for the 62nd Winter Nuclear and Particle Physics Conference (WNPPC2026) are NOW open!

Conference Dates: February 12-15, 2026
Location: Banff Centre, Banff, Alberta, Canada
Website:

Important Deadlines:

- Abstract Submission Deadline: December 7, 2025 (extended)
- Feedback on Abstracts: December 19, 2025
- Early Registration Fee Deadline: January 9, 2026
- Room Booking (Group Rate) Ends: January 13, 2026
- Registration Ends: February 1, 2026

The Winter Nuclear and Particle Physics Conference is a national meeting for the Canadian subatomic physics community, with a special focus on providing a forum for junior researchers (students and postdocs) and encourages scientific discussions and community building with subatomic research groups from across Canada.

WNPPC2026 will feature sessions focusing on the research areas of interest to the Canadian subatomic physics community, both experimental and theoretical.There will be invited talks in:

- Electroweak and Higgs Physics
- Neutrino Properties
- QCD and Hadrons
- Physics Beyond the Standard Model
- Nuclear Structure
- Nuclear and Particle Astrophysics
- Equity, Diversity, and Inclusion in Nuclear & Particle Physics

For questions, reach out to wnppc@triumf.ca.

We look forward to seeing you in Banff for WNPPC2026!

The WNPPC Organizing Committee:

Corina Andreoiu (SFU, past co-chair)
Erica Caden (SNOLAB and McGill)
Thomas Brunner (McGill)
Alain Bellerive (Carleton University, co-chair)
Tim Friesen (University of Calgary)
Gwen Grinyer (University of Regina)
Annika Lennarz (TRIUMF, permanent member, past co-chair)
Tony Noble (Queen's University, permanent member)
Heather Russell (University of Victoria, co-chair)
Jana Thomson (TRIUMF, Conferences Facilitator)

5. NSERC Support for CINP

NSERC provides funding for many CINP activities through the Subatomic Physics Major Resources Support (SAP-MRS) program. The installment for 2025-26 is $100,000, of which about 25% is allocated for Canadian Subatomic Physics Long Range Plan expenses.

6. Grad classes offered by TRIUMF

(submitted by Marcello Pavan, TRIUMF)

TRIUMF periodically offers a few graduate-level courses, usually in the fall and winter terms, which could be of interest to your students. The courses are run online through UBC or UVic. Typically students would register at their local department in a 'directed studies' or 'special topics' course, though students in western Canada could take advantage of the Western Dean's Agreement to transfer course credit directly.

In Winter 2026, the following courses are planned. **Students are asked to contact the lecturer directly is they are interesting in taking, or want more information about, the course.**

UBC PHYS 505 — Nuclear Physics

https://phas.ubc.ca/~behr/phys505/

To be taught online Jan-April 2026 by Barry Davids and John Behr. Thanks to the non-UBC students who have already registered through academic agreements with UBC, which helped confirm it would be offered this winter. We continue to welcome advisors and students to indicate possible interest to behr@triumf.ca

Nucleons and their structure, hadrons and isospin, two-nucleon systems, the *NN* interaction; bulk properties of nuclei, nuclear excitations and radioactivity, nuclear models; strong and electromagnetic decay, symmetries and weak interaction; nuclear reactions, nuclear astrophysics.

Prerequisites: PHYS 500 Quantum Mechanics I or equivalent (one semester of grad QM)

Textbook: Samuel S.M. Wong, Introductory Nuclear Physics, 2nd ed. Wiley (.pdf available at publisher with UBC library privileges)

Contacts: Dr. John Behr <behr@triumf.ca> and Dr. Barry Davids <davids@triumf.ca>

UBC PHYS 528 Elementary Particle Physics

https://particletheory.triumf.ca/PHYS528/

This course will cover the underlying theory of the Standard Model (SM) of particle physics. The goal is to cover the minimum of what a PhD in subatomic physics should know about the Standard Model, including both theorists and experimentalists.

Starting from Feynman diagrams and quantum electrodynamics (QED), we will build up the other elements of the SM including the strong and weak forces and the Higgs mechanism. We will also connect the SM to experimental observations at high energy colliders and beyond.

Prerequisite: Familiarity with obtaining Feynman rules from a Lagrangian, and know how to compute scattering amplitudes in QED.

Time: Tue/Thur 9:30-11:00 Pacific, Jan 6 - Apr 9

Contact: Dr. David Morrissey <dmorri@triumf.ca>

UBC PHYS 560 / UVic PHYS 522 Physics and Engineering of Particle Accelerators

The course will provide an introduction to the physics and technology of particle accelerators concentrating particularly on proton and ion accelerator technology. The course will include a survey of existing accelerator types and an introduction to transverse and longitudinal beam optics. The course will also include an introduction to the physics and technology of ion sources, will give an overview of radioactive ion beam production, of accelerator radio-frequency principles and more detailed aspects of room temperature and superconducting linear accelerators, as well as high energy circular machines. The course should appeal to students of Accelerator Physics, as well as to students of Experimental Nuclear and Particle Physics and other students interested in Particle Accelerators.

Time: Tue/Thu 2-3:30 pm Pacific, Jan 8 -Apr 7, 2026

Slides and all other information will be posted on a web-based learning management system BrightSpace at UVic. Homework assigned once a week. Two exams, mid-term and a final. Both are open-book.

Contact:
Dr. Oliver Kester <okester@triumf.ca>

7. CINP Conference Support

CINP extends partial funding to workshops, meetings and conferences of broad relevance to nuclear physics in Canada. Requests are appraised against the mission and goals of the CINP, and funding is contingent upon satisfactorily showing that the event will further the aims of the CINP and be of benefit to its members. **Application forms for external conference support are available from https://cinp.ca/conference-support**

8. Report from the CINP_sponsored workshop: Neutrinoless double beta decay search in Xe – next-generation experiments

(submitted by Thomas Brunner, McGill)

One of the biggest questions in contemporary physics is how we came to exist in a matter-dominated universe. Based on the Standard Model of particle physics, we assume that almost equal amounts of matter and antimatter were produced in the Big Bang. Yet, somehow matter is dominantly present in our universe. Physicists speculate the existence of a special radioactive decay in which two matter particles (electrons or beta particles) are created but no antimatter (antineutrinos). Such decay, called neutrinoless double beta decay, is being searched for by several international collaborations. These experiments are extremely demanding because everything around us is more radioactive than this decay: current limits on such decays are on the order of 10^{26} years, or 10^{16} times the age of the universe.

International experts for rare-event searches met at a workshop at McGill University November 12-14, 2025 to discuss possibilities and opportunities for a coherent collaborative effort to search for neutrinoless double beta decay in in the isotope xenon-136. Members from the Xe-based double-beta decay experiments KamLAND-ZEN, nEXO, NEXT, PandaX, and XLZD presented the current state of the art in the field, and highlighted topics for future joint efforts. A panel featuring underground laboratory directors Jodi Cooley (SNOLAB, ON) and Sean Paling (Boulby Lab, UK), along with experimentalists Daniel Akerib (SLAC, USA), Juan JoseGomez Cadenas (DIPC, Spain), and Krishna Kumar (UMass Amherst, USA), and moderated by Nobel Laureate Art McDonald (Queen's U., ON), discussed the various experimental strategies being pursued and how they might be coordinated to maximize scientific reach. TRIUMF's Executive Director Nigel Smith provided updates from a group of international funding agencies, including ISED, CFI, and NSERC, and laboratory directors. And of course participants also visited the local neutrino lab at the Physics Department.

The atmosphere was very constructive and future-oriented. Participants at the workshop recognized the need for joining efforts towards realizing a next-generation flagship experiment with significant scientific reach in the search for neutrinoless double beta decay. A follow-up workshop has been proposed in 6 months from now to plan next steps.

The workshop was organized by Thomas Brunner, Roxanne Guenette, Mike Heffner, Ben Jones, Justo Martin-Albo, and Fran Spidle. It was partially supported by CINP, IPP, the McDonald Institute, SNOLAB, TRIUMF, and McGill.

9. 8th International Workshop on the Application of Noble Gas Xenon to Science and Technology (XeSAT)
(submitted by Chloe Malbrunot, TRIUMF)

The XeSAT International Workshop is coming to Canada for the first time, following seven successful editions across Asia and Europe! Join us for XeSAT 2026, taking place **May 19-22, 2026**, at TRIUMF.

XeSAT brings together the global xenon (and extended noble liquid) science community to exchange recent advances in xenon-based technologies and their applications across a wide range of scientific and technological domains, including dark matter searches, neutrinoless double-beta decay, precision measurements, and medical applications. The program will also include a dedicated industry session, where industry partners will provide perspectives on the procurement, and enrichment of noble gases. A poster session will focus on technological developments.

Registration for the workshop is now open.
Event details and registration:
https://indico.triumf.ca/event/803/overview

Key Dates

- **Abstract submission deadline: December 15**
- **Early registration closes: February 27**

We strongly encourage students and postdocs to submit abstracts. Early-career participants selected for talks or posters will receive priority for accommodation at TRIUMF House, which offers substantially lower rates compared to standard Vancouver lodging at this time of year.

The XeSAT Organizing Committee looks forward to welcoming you to beautiful Vancouver!

10. Nuclear Structure 2026
(submitted by Corina Andreoiu, SFU)

Website: https://indico.triumf.ca/event/745/

Get ready for an unforgettable experience at the 20th biennial Nuclear Structure Conference, proudly hosted by Simon Fraser University and TRIUMF from **July 27-31, 2026**.

The conference will spotlight groundbreaking research and development in both experimental and theoretical nuclear structure physics, diving deep into the fascinating properties of nuclei at the far reaches of isospin, excitation energy, mass, and angular momentum.

Nuclear science and the vibrant charm of Vancouver await you—don't miss out!

11. CINP Undergraduate Research Scholarship Highlight: Working towards demonstrating C-violating decays of pseudoscalar particles into 3 photons

(submitted by Ripanjeet Singh Toor and Andrzej Czarnecki, U.Alberta)

Ripanjeet worked on the one-loop calculation of Para–Positronium decay into 3γ mediated by the Z boson. He started the summer studying the fundamentals and techniques using *The Standard Model Workbook* by Thomas A. Moore. He then engaged with important methods in quantum field theory, including dimensional regularization, the reduction of higher-point integrals, and Passarino–Veltman reduction of tensor integrals. For this purpose, he utilized several software packages such as FeynCalc, FormCalc, and FeynHelpers within Mathematica, designed for diagram and field-theoretic calculations. In addition, he gained familiarity with the symbolic manipulation tool FORM, whose use was emphasized throughout the research term and proved to be highly beneficial.

The scholarship also supported Ripanjeet's broader development as a researcher. He regularly participated in group meetings, where he presented progress reports and contributed to scientific discussions. He carried out detailed reviews of the relevant literature, which not only advanced his own understanding but also provided useful context for our team. Through these activities, he improved his technical skills, his ability to communicate scientific ideas clearly, and his familiarity with the standards of professional research in nuclear and particle physics.

This period of support was important not only for Ripanjeet's personal development but also for the strength of our research program. The scholarship enabled him to make progress at a formative stage, helping to ensure continuity in our group's work. The training he received will likely have lasting benefits, equipping him to take on more advanced problems and, in the longer term, to contribute to the broader particle physics research community. The calculation of the decay rate is still being completed, and we expect to submit the results for publication soon.

We would like to express our appreciation to CINP for providing this opportunity. Programs such as this play an essential role in sustaining the next generation of researchers.

12. Research Scholarship Highlight: Update on the ePIC Barrel Imaging Calorimeter (BIC) for EIC

(submitted by Zisis Papandreou, U.Regina)

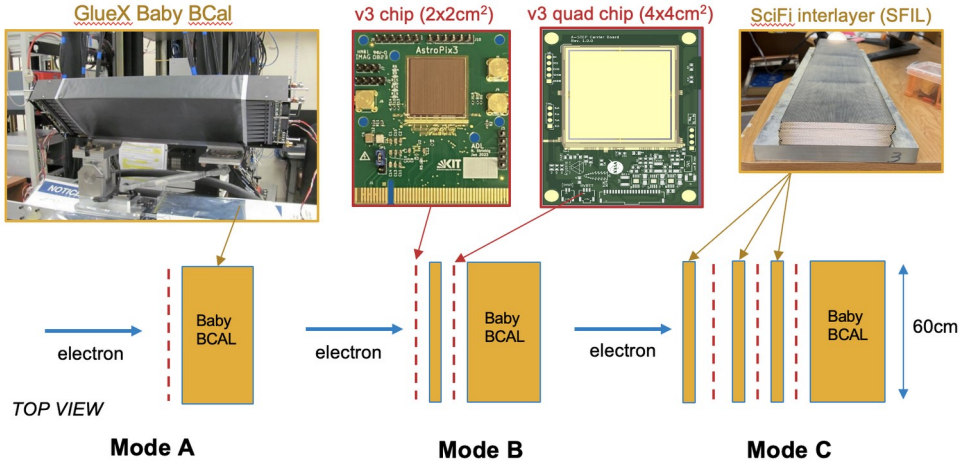
The future Electron-Ion Collider (EIC) will probe the fundamental properties of matter by examining the structure of nucleons and nuclei with unprecedented precision. The EIC and its first experiment ePIC (the electron-Proton/Ion Collider experiment) will be based at Brookhaven National Laboratory, and aim to address some of the most profound questions in modern nuclear physics, including the origin of proton mass and spin, as well as the behaviour of dense gluonic matter.

In the central barrel region, the electromagnetic calorimeter must provide electron identification and enable electron–pion separation for energies between 1 GeV and 50 GeV, as well as being able to reconstruct photons between 100 MeV - 10 GeV. It must also measure photon energy and position to identify signatures from deeply virtual Compton scattering and neutral pion decays. The device that will accomplish these goals is the ePIC Barrel Imaging Calorimeter (BIC) which will deliver precise three-dimensional imaging of particle showers.

To meet the requirements in the barrel region, imaging calorimetry has been chosen for thePIC detector. By integrating PbScFi layers with AstroPix Monolithic Active Pixel Sensors, BIC will deliver precise three-dimensional imaging of particle showers. This will be a 40 ton device, costing US$23M. It is approaching the pre-production phase, where "first article" components (PbScFi, AstroPix, electronics) are being designed and tested. To validate the performance of BIC, parasitic beam tests were run in Hall D/Jefferson Lab and at Fermilab. All tests include or will include a bulk PbScFi prototype of the GlueX barrel e-m calorimeter (BCAL), termed Baby BCAL. It was tested at Hall D in 2023 using 3-6 GeV positrons, and the energy resolution was extracted resulting in a constant term of about 2%.

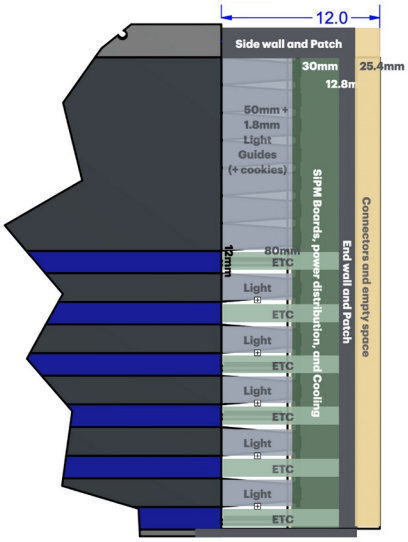
Baby BCAL was then loaned to Argonne National Lab and that group carried out the Fermilab beam test in 2024, where the PbScFi was coupled with an AstroPix tracking/imaging layer as shown in Mode A

in the figure below, using conventional VME electronic readout (H. Klest et al, JINST 20 (2025) 07, P07028) and demonstrating coincidences between the AstroPix and PbScFi.

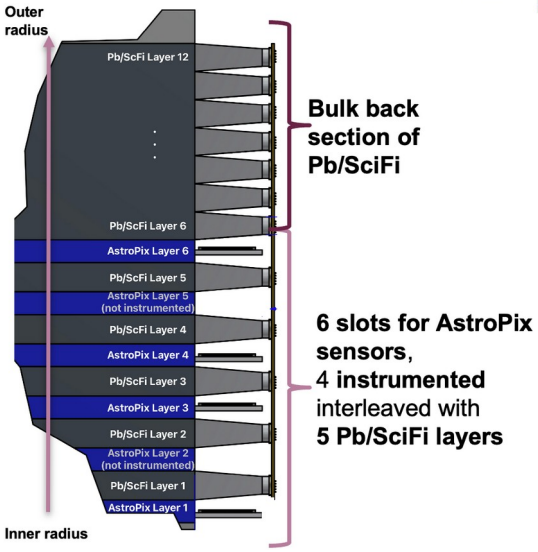


A third beam test is planned at Hall D of JLab in 2026, using Modes B and C, where in addition to thin PbScFi interlayers and more AstroPix layers with newer chips, a streaming readout (HGCROC) will be tested. That technology has been successfully deployed at CERN experiments and will also be implemented for other calorimeters in ePIC.

The primary responsibility of the Canadian EIC detector groups (U of Regina, U Manitoba, Mt. Allison U) is the design, R&D and construction of 98 End-of-Sector (ESB) boxes, which will be mounted at the end of 435-cm-long PbScFi sectors and that will be assembled in the shape of a barrel with an inner diameter of 80 cm and an outer one of 120 cm. Schematics are shown in the attached diagrams.



Each ESB will contain 60 acrylic light guides that couple to 60 large-array Hamamatsu S14161-3050HS silicon photomultipliers (SiPMs, comprised of an array of 4x4 3x3mm^2 with nearly 50% photon detection efficiency) via Si optical cookies. Each ESB will also contain the End-of-Tray cards that will be developed by NASA/GSFC to readout the AstroPix trays, through AstroLinx boards. Power will be supplied to the SiPMs and AstroPix and their signal readout will be provided by the next generation HGCROC boards, termed CALOROC. The ESBs will contain chilled-water lines and nitrogen flushing to temperature-stabilize the SiPMs and remove heat from the electronics, while ensuring condensation does not form inside. All of this needs to fit within a narrow 12-cm envelope. Preproduction of 'first article' ESBs will occur in 2026 and early 2027, moving to production in 2027/8 with delivery to Brookhaven by mid 2030.



13. CINP Sessions at the CAP 2026 Congress

As is now customary, the CINP and IPP are hosting a joint session at the CAP Congress, jointly held at the University of Ottawa and Carleton University, in Ottawa. The CINP sessions are planned near the end of the Congress, so plan your travel accordingly.

Time	Event (tentative schedule)
Thursday, June 25, 2026	
7:30	**CINP Breakfast Board Meeting** (by invitation only)
12:00	**CINP Individual Members Annual Meeting**
13:30	**CAP-TRIUMF Vogt Medal talk**
14:15	**CINP+IPP Joint Session**

14. CINP Board of Directors

The affairs of the CINP are managed by a Board of Directors, which is selected by the Institutional Members in a staggered manner to provide continuity.

Name	Institution	Role	Email	Term Ends
Svetlana Barkanova	Memorial		sbarkanova @ mun.ca	June, 2028
Thomas Brunner	McGill		thomas.brunner @ mcgill.ca	June, 2028
Olga (Liliana) Caballero	Guelph		ocaballe @ uoguelph.ca	June, 2026
Gwen Grinyer	Regina	President	gwen.grinyer @ uregina.ca	June, 2027
Russell Mammei	Winnipeg	Vice-President	r.mammei @ uwinnipeg.ca	June, 2026
Chris Ruiz	TRIUMF	Secretary	ruiz @ triumf.ca	June, 2027

15. CINP Contact Information

CINP Executive Director:

If you require information about any CINP programs, please do not hesitate to contact:

Garth Huber, Ph.D.
CINP Executive Director
c/o University of Regina
huberg@cinp.ca

CINP Treasurer:

Greg Hackman
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treasurer@cinp.ca

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Jeff Martin (Winnipeg)
Hadronic Physics/QCD:
Svetlana Barkanova (Memorial)
Nuclear Astrophysics: Nicole Vassh (TRIUMF)
Nuclear Education and Training:
Ruben Sandapen (Acadia)
Nuclear Structure: Paul Garrett (Guelph)
Nuclear Theory: Alexandros Gezerlis (Guelph)

This Newsletter was edited by Garth Huber. Email regarding the content of this newsletter, or suggestions for content in future CINP newsletters should be sent to huberg@cinp.ca