

Job Summary

Category: Postdoctoral Positions and Fellowships

Institution: University of Toronto

Department: Canadian Institute for Theoretical Astrophysics (CITA) and Department of Chemistry

Expected Start Date: October, 2026

Duration: 3 Years

Work Arrangement: In-Person

In-Person Location(s): Toronto ON Canada

Job Description

Postdoctoral Researcher in Astrobiology

The University of Toronto invites applications for a postdoctoral researcher to join a research program in astrobiology, with a focus on organic chemistry. The successful candidate will conduct laboratory studies or chemical computational modeling or sensor development aimed at understanding the formation, stability, and behavior of organic molecules in chemically extreme environments. Research directions are broad and may include biomolecule stability in concentrated sulfuric acid, chemistry in ionic liquids, lipid and vesicle formation in water and non-water solvents, and alternative pathways for molecular assembly and energy storage.

Description of duties

- Carry out laboratory experiments or computational modeling on organic molecules in chemically extreme environments, including non-aqueous solvents such as ionic liquids and concentrated sulfuric acid.
- Design experiments that quantify molecular stability and identify degradation pathways (e.g., hydrolysis, oxidation, acid-catalyzed reactions) under controlled conditions of acidity, temperature, and concentration.
- Use and adapt analytical tools (e.g., NMR, mass spectrometry, optical spectroscopy, circular dichroism) to measure chemical composition, structural changes, and reaction products in systems where standard protocols are not directly applicable.
- Construct and study lipid and vesicle systems, including testing membrane formation, growth, and persistence in defined solvent environments with controlled composition and water activity.
- Design, build, and test miniature molecular sensors, including selecting or engineering receptor materials (e.g., polymers or functionalized surfaces) and evaluating sensor response, sensitivity, and selectivity to target molecules.
- Quantitatively analyze data to determine reaction rates, stability limits, product distributions, and sensor performance metrics, and relate these to specific planetary conditions (e.g., temperature, pressure, and composition of Venus cloud layers).
- Collaborate with team members and contribute to manuscripts, presentations, and joint research efforts.

Required Qualifications

- PhD in chemistry, planetary science, or a related field.
- Strong background in organic chemistry and/or physical chemistry, chemical physics, or a related field.
- Demonstrated strength in experimental design and laboratory work and/or experience developing computational or theoretical models.

One or more of the following

- Experience with lipids, membranes, or vesicle systems and/or experience in molecular modeling or simulation of chemical systems.
- Experience with one or more advanced characterization techniques, such as: solution or solid-state NMR, mass spectrometry, confocal microscopy, cryo-electron microscopy (cryoEM), infrared (IR) or Raman spectroscopy, UV–Vis or fluorescence spectroscopy, circular dichroism (CD), or dynamic light scattering (DLS); and/or experience with computational chemistry methods (e.g., ab initio, DFT, molecular dynamics).
- Experience working with complex chemical mixtures or heterogeneous systems and/or experience with high-dimensional parameter spaces or model ensembles.
- Experience with quantitative analysis or kinetic measurements (e.g., reaction rates, stability studies) and/or experience with statistical inference, data-driven modeling, or AI-driven workflows.
- Experience with or interest in molecular sensor development, including materials, receptor design, or signal transduction methods and/or experience in instrumentation or device development.
- Ability to work independently and collaboratively in an interdisciplinary research environment.

Compensation

An annual salary of \$80,000, plus benefits. Funds will be available for travel and other research expenses.

Please note that if the minimum rates stipulated in the collective agreement are higher than rates stated in this posting, the minimum rates stated in the collective agreement will take precedence.

Application Instructions

Applicants will be asked to submit a curriculum vitae, statement of research interests and arrange for three letters of recommendation.

We only accept electronic submissions. Please send applications to seager@cita.utoronto.ca .

The deadline for applications and all letters of recommendation is April 30, 2026.

Please contact seager@cita.utoronto.ca for inquiries.

Diversity Statement

The University of Toronto embraces Diversity and is building a culture of belonging that increases our capacity to effectively address and serve the interests of our global community. We strongly encourage applications from Indigenous Peoples, Black and racialized persons, women, persons with disabilities, and people of diverse sexual and gender identities. We value applicants who have demonstrated a commitment to equity, diversity and inclusion and recognize that diverse perspectives, experiences, and expertise are essential to strengthening our academic mission.

Accessibility Statement

The University strives to be an equitable and inclusive community, and proactively seeks to increase diversity among its community members. Our values regarding equity and diversity are linked with our unwavering commitment to excellence in the pursuit of our academic mission. The University is committed to the principles of the Accessibility for Ontarians with Disabilities Act (AODA). As such, we strive to make our recruitment, assessment and selection processes as accessible as possible and provide accommodations as required for applicants with disabilities.