

## Daniel D. Lascar

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### AFFILIATION

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#### TRIUMF

Science Division  
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Vancouver BC V6T 2A3  
CANADA

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### CITIZENSHIP

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United States of America

### WORK EXPERIENCE

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#### TRIUMF

*Postdoctoral Fellow*

Vancouver, BC

*June 2014-Present*

*Commissioning TITAN's new Cooler Penning Trap (CPET) which will sympathetically cool highly charged ions with a room-temperature electron plasma and prepare the ions for mass measurement.*

- Designed, fabricated, installed and characterized a new “mesh” detector for detecting properly trapped electrons inside CPET’s magnetic field. The detector is polarity agnostic and can be made transparent to ions.
- Creating new electrodes in preparation for the mating of CPET to the TITAN beamline.
- Shepherding through two experiment proposals and a letter of intent that I authored through the planning processes of their respective institutions.
  - Masses of Ge & Se *r*-Process Nuclei Beyond the N=50 Waiting Point – *Experiment*
    - Eight days approved at Priority I.
  - Precision Mass Measurements of <sup>147-149</sup>Cs – *Experiment*
    - Three days approved at medium priority.
  - Precision Mass Measurements of *r*-Process Relevant Copper Isotopes, Towards and Including <sup>81</sup>Cu – *Letter of Intent*
    - Endorsed with high priority.
- Leading shifts during all TITAN experiments (mass measurements and in-trap decay spectroscopy) and taking on the role of safety officer.
- Preparing the safety and beam preparation documentation for all TITAN experiments.
- Supervising a graduate student working on the CPET commissioning project.
- Presenting work at international conferences.
- Teaching a six-lecture course on detector physics as part of TRIUMF’s *Postdoc Lecture Series* as well as giving guest lectures on mass measurements to nuclear chemistry students at Simon Fraser University.

McMaster-Carr Supply Company  
Systems Manager

Elmhurst, IL  
August 2013-May 2014

*A group leader in the Systems Department of an industrial supply company with ~US\$2B in annual sales.*

- Led the initiative to bring the warehouse material handling programming and source control into the Systems Department's purview.
- Oversaw a team of three employees that designed and implemented network infrastructure redesigns and new software rollouts for all five of the company's warehouses (Illinois, Georgia, New Jersey, Ohio and California).
- Worked with vendors and conveyor integrators on warehouse upgrade projects for all five branches and made recommendations to VP-level executives as to the feasibility and success of those projects.

Systems Analyst

October 2012-August 2013

- Wrote and maintained routines in mainframe and Windows computing environments.
- Took the lead on a project to upgrade 50% of the company's legacy mainframe code whose support was being phased out by IBM.
- Performed statistical analysis on order database records in order to define the scope of my proposed work.
- Used my experience from Argonne National Laboratory to use programmable logic controllers to begin working on warehouse and conveyor-related data projects.

Argonne National Laboratory  
Doctoral Candidate

Argonne, IL  
January 2006-September 2012

*Performed high precision mass measurements of short-lived nuclei with the Canadian Penning Trap Mass Spectrometer on the ATLAS accelerator at Argonne National Laboratory.*

- Thesis Title: *Precision Mass Measurements of Short-Lived, Neutron-Rich, R-Process Nuclei About the N=82 Waiting Point.*
- Measured the masses of  $^{130-131}\text{In}$ ,  $^{130-135}\text{Sn}$ ,  $^{131-137}\text{Sb}$ ,  $^{133,135-140}\text{Te}$ ,  $^{131-135,139-141}\text{I}$  and  $^{142-146}\text{Cs}$ .
- Performed data analysis with the group's in-house suite of analysis software.
- Designed, procured and helped install every piece of the low energy beamline at ATLAS' Californium Rare Isotope Breeder Upgrade (CARIBU) facility.
- Achieved proficiency in computer-aided drafting in both two- and three-dimensions.
- Made programmatic changes to the experiment's data acquisition system in FORTRAN that improved both program efficiency and data fitting quality.
- Implemented the Stored Waveform Fourier Transform (SWIFT) technique for use in the experiment.
- Automated the experiment's vacuum system with a PLC and Ladder Logic so that any member of the collaboration could operate the system from a single location.
- Designed and built radiofrequency coupling circuits for several of the group's radiofrequency quadrupole ion guides and traps.
- Presented ongoing work at national and international conferences.
- Participated in all of the group's experiments including (but not limited to) mass measurements,  $\beta$ -endpoint measurements and  $\beta$ -v angular correlations in the Beta-Paul Trap.
- Set up and maintained a cryogenically cooled gas target for experiments.

Weizmann Institute of Science  
Research Assistant

Rehovot, Israel  
June 2003-February 2004

*Worked in the Weizmann Institute's detector lab developing uses for Gas Electron Multipliers (GEMs)*

- Expanded upon previous work on Gas Electron Multipliers (GEMs) from bachelor's thesis and built a multi-GEM detector to detect single electrons.
- Learned chemical deposition techniques to create both visible and ultraviolet light photocathodes.
- Attained proficiency in clean-room procedures.

## EDUCATION

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- Ph.D., Physics, Northwestern University, Evanston, Illinois, USA December 2012
  - Thesis Title: *Precision Mass Measurements of Short-Lived, Neutron-Rich, R-Process Nuclei About the  $N=82$  Waiting Point.*
- M.Sc., Physics, Northwestern University, Evanston, Illinois, USA January 2006
  - 3.4/4.0 GPA
  - First among my entering class to finish the requirements for a master's degree and to begin the doctoral candidacy.
  - Taught undergraduate courses and laboratory sections in Mechanics, Electricity & Magnetism, and Waves & Optics.
  - Courses completed include: Nuclear Astrophysics, Nuclear Physics, Instrumentation, Stellar Astrophysics, Quantum Field Theory, Particle Physics, Statistical Mechanics, Electrodynamics, and Cosmology.
- A.B., Physics with Specialization in Astrophysics, The University of Chicago, Chicago, Illinois, USA June 2003
  - 3.4/4.0 GPA
  - Bachelor's thesis on GEMs, a novel type of large area charged particle detector.
  - Rebuilt and tested a calorimeter for the CREAM balloon project.
  - Physics courses completed include: Quantum Mechanics, Atomic Physics, Solid State Physics, Classical Mechanics, Multi-Variable Calculus, and Linear Algebra.

## PUBLICATIONS IN PEER REVIEWED JOURNALS

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1. D. Lascar, A. A. Kwiatkowski, U. Chowdhury, A. Finlay, A. T. Gallant, M. Good, R. Klawitter, B. Kootte, K. G. Leach, A. Lennarz, E. Leistenschneider, B. E. Schultz, R. Schupp, D. A. Short, C. Andreoiu, J. Dilling and G. Gwinner, "Improvements to TITAN's Mass Measurement and Decay Spectroscopy Capabilities," Preprint: *arXiv:1508.06693*. Submitted to *NIMB*.  
*Wrote the paper. Responsible for all of the work in the CPET section.*
2. R. Klawitter, A. Bader, U. Chowdhury, A. Chaudhuri, J. Fallis, A. T. Gallant, A. Grossheim, A. A. Kwiatkowski, D. Lascar, K. G. Leach, A. Lennarz, T. D. Macdonald, J. Parkes, S. Seeraji, M. C. Simon, V. V. Simon, B. E. Schultz and J. Dilling, "Mass measurements of neutron-rich Rb/Sr," Submitted to *Phys. Rev. C*.  
*Responsible for the nuclear astrophysics calculations and the resulting abundance graphs.*

3. U. Chowdhury, M. Good, B. Kootte, D. Lascar, B. E. Schultz, J. Dilling, and G. Gwinner, “A Cooler Penning trap for the TITAN mass measurement facility,” *PROCEEDINGS OF THE XII INTERNATIONAL SYMPOSIUM ON ELECTRON BEAM ION SOURCES AND TRAPS*, **1640** 120 (2015).  
*Worked on all of the diocotron data.*
4. N. D. Scielzo, R. M. Yee, P. F. Bertone, F. Buchinger, S. Caldwell, J. A. Clark, A. Czeszumaska, C. M. Deibel, J. P. Greene, S. Gulick, D. Lascar, A. F. Levand, G. Li, E. B. Norman, S. Padgett, M. Pedretti, A. Perez Galvan, G. Savard, R. E. Segel, K. S. Sharma, M. G. Sternberg, J. Van Schelt, and B. J. Zabransky, “A Novel Approach to  $\beta$ -delayed Neutron Spectroscopy Using the Beta-decay Paul Trap,” *Nucl. Data Sheets*, **120** 70 (2014).  
*Took shifts on the experiments. Delivered isobarically pure beams to the Beta-Paul Trap.*
5. J. Van Schelt, D. Lascar, G. Savard, J. A. Clark, P. F. Bertone, S. Caldwell, A. Chaudhuri, A. F. Levand, G. Li, G. E. Morgan, R. Orford, R. E. Segel, K. S. Sharma, and M. G. Sternberg, “First Results from the CARIBU Facility: Mass Measurements on the r-Process Path,” *Phys. Rev. Lett.*, **111** 061102 (2013).  
*Co-author. Data are part of my Ph.D. thesis. Worked in concert with Van Schelt, preparing and leading the experiment, sharing the data analysis. Worked together on the manuscript.*
6. R. M. Yee, N. D. Scielzo, P. F. Bertone, F. Buchinger, S. Caldwell, J. A. Clark, C. M. Deibel, J. Fallis, J. P. Greene, S. Gulick, D. Lascar, A. F. Levand, G. Li, E. B. Norman, M. Pedretti, G. Savard, R. E. Segel, K. S. Sharma, M. G. Sternberg, J. Van Schelt, and B. J. Zabransky, “ $\beta$ -Delayed Neutron Spectroscopy Using Trapped Radioactive Ions,” *Phys. Rev. Lett.*, **110** 092501 (2013).  
*Took shifts on the experiments. Delivered isobarically pure beams to the Beta-Paul Trap.*
7. G. Li, R. Segel, N. Scielzo, P. Bertone, F. Buchinger, S. Caldwell, A. Chaudhuri, J. Clark, J. Crawford, C. Deibel, J. Fallis, S. Gulick, G. Gwinner, D. Lascar, A. Levand, M. Pedretti, G. Savard, K. Sharma, M. Sternberg, T. Sun, J. Van Schelt, R. Yee, and B. Zabransky, “Tensor Interaction Limit Derived From the  $\alpha$ - $\beta$ - $\nu^-$  Correlation in Trapped Li8 Ions,” *Phys. Rev. Lett.*, **110** 092502 (2013).  
*Took shifts on the experiments. Delivered isobarically pure beams to the Beta-Paul Trap. Built shielding for the strip detectors.*
8. J. Van Schelt, D. Lascar, G. Savard, J. A. Clark, S. Caldwell, A. Chaudhuri, J. Fallis, J. Greene, A. Levand, G. Li, K. Sharma, M. Sternberg, T. Sun, and B. Zabransky, “Mass measurements near the r-process path using the Canadian Penning Trap mass spectrometer,” *Phys. Rev. C*, **85** 1 (2012).  
*Co-author. Data are part of my PhD thesis. Worked in concert with Van Schelt, preparing and leading the experiment, sharing the data analysis. Worked together on the manuscript.*
9. N. D. Scielzo, G. Li, M. G. Sternberg, G. Savard, P. F. Bertone, F. Buchinger, S. Caldwell, J. A. Clark, J. Crawford, C. M. Deibel, J. Fallis, J. P. Greene, S. Gulick, A. a. Hecht, D. Lascar, J. K. P. Lee, A. F. Levand, M. Pedretti, R. E. Segel, H. Sharma, K. S. Sharma, I. Tanihata, J. Van Schelt, R. M. Yee, and B. J. Zabransky, “The  $\beta$ -Decay Paul trap: A radiofrequency-quadrupole ion trap for precision studies,” *NIMA*, **681** 94 (2012).  
*Took shifts on the experiments. Delivered isobarically pure beams to the Beta-Paul Trap.*

10. R. Vondrasek, S. Baker, P. Bertone, S. Caldwell, J. A. Clark, C. Davids, D. Lascar, A. Levand, K. Lister, R. Pardo, D. Peterson, D. Phillips, G. Savard, M. Sternberg, T. Sun, J. Van Schelt, and B. Zabransky, “COMMISSIONING EXPERIENCE WITH CARIBU,” *Proceedings of HIAT 2012*, 45 (2012).  
*Designed, procured the equipment for, and helped assemble the CARIBU low energy beamline.*
11. A. Chaudhuri, P. F. Bertone, F. Buchinger, S. Caldwell, J. A. Clark, J. E. Crawford, C. M. Deibel, S. Gulick, D. Lascar, a F. Levand, G. Li, G. Savard, R. E. Segel, K. S. Sharma, M. G. Sternberg, T. Sun, and J. Van Schelt, “Studies of neutron-rich nuclei using the CPT mass spectrometer at CARIBU,” *J. Phys. Conf. Ser.*, **312** 042009 (2011).  
*Took shifts during the experiments.*
12. J. Fallis, J. A. Clark, K. S. Sharma, G. Savard, F. Buchinger, S. Caldwell, A. Chaudhuri, J. E. Crawford, C. M. Deibel, S. Gulick, A. A. Hecht, D. Lascar, J. K. P. Lee, a F. Levand, G. Li, B. F. Lundgren, A. Parikh, S. Russell, M. Scholte-van de Vorst, N. D. Scielzo, R. E. Segel, H. Sharma, S. Sinha, M. G. Sternberg, T. Sun, I. Tanihata, J. Van Schelt, J. C. Wang, Y. Wang, C. Wrede, and Z. Zhou, “Mass measurements of isotopes of Nb, Mo, Tc, Ru, and Rh along the vp- and rp-process paths using the Canadian Penning trap mass spectrometer,” *Phys. Rev. C*, **84** 4 p. 1 (2011).  
*Analyzed the Mo data. Took shifts during the experiment.*
13. N. D. Scielzo, S. Caldwell, G. Savard, J. A. Clark, C. M. Deibel, J. Fallis, S. Gulick, D. Lascar, A. F. Levand, G. Li, J. Mintz, E. B. Norman, K. S. Sharma, M. G. Sternberg, T. Sun, and J. Van Schelt, “Double- $\beta$ -decay Q values of  $^{130}\text{Te}$ ,  $^{128}\text{Te}$ , and  $^{120}\text{Te}$ ,” *Phys. Rev. C*, **80** 025501 (2009).  
*Delivered isobarically pure beams to the Beta-Paul Trap. Took shifts on the experiments.*
14. J. Fallis, J. A. Clark, K. Sharma, G. Savard, F. Buchinger, S. Caldwell, J. Crawford, C. Deibel, J. Fisker, S. Gulick, A. Hecht, D. Lascar, J. Lee, A. Levand, G. Li, B. Lundgren, A. Parikh, S. Russell, M. de Vorst, N. Scielzo, R. E. Segel, H. Sharma, S. Sinha, M. G. Sternberg, T. Sun, I. Tanihata, J. Schelt, J. Wang, Y. Wang, C. Wrede, and Z. Zhou, “Determination of the proton separation energy of Rh93 from mass measurements,” *Phys. Rev. C*, **78** 2 (2008).  
*Took shifts during the experiment.*
15. J. Fallis, J. A. Clark, K. S. Sharma, G. Savard, F. Buchinger, S. Caldwell, J. E. Crawford, C. M. Deibel, J. L. Fisker, S. Gulick, A. A. Hecht, D. Lascar, J. K. P. Lee, A. F. Levand, G. Li, A. Parikh, N. D. Scielzo, R. E. Segel, H. Sharma, M. G. Sternberg, T. Sun, J. Van Schelt, and C. Wrede, “Mass Measurements of Proton-Rich Isotopes in the Vicinity of 92Ru and 93Rh for ‘nu’p-process Models,” in *10th Symposium on Nuclei in the Cosmos*, (2008).  
*Took shifts during the experiment.*
16. J. Van Schelt, G. Savard, S. Caldwell, J. A. Clark, J. Fallis, J. P. Greene, D. Lascar, A. F. Levand, G. Li, R. E. Segel, K. S. Sharma, M. G. Sternberg, T. Sun, and B. J. Zabransky, “Precision Mass Measurements of Heavy 252Cf Fission Fragments Near the r-process Path,” in *Proceedings of Science*, 2008.  
*Took shifts during the experiment.*

## CONTRIBUTIONS AT CONFERENCES AND WORKSHOPS

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- ARIEL Science Workshop 2015. July 10-11, Vancouver, British Columbia, Canada.  
*Mass Measurements of Astrophysically Important Nuclei at TITAN* – submitted talk.
- Electromagnetic Isotope Separators (EMIS) 2015. May 11-15, Grand Rapids, Michigan, USA.  
*Status of TITAN's Cooler Penning Trap for Highly Charged Ions* – submitted poster.
- American Physical Society's Division of Nuclear Physics Meeting 2011. October 26-29, East Lansing, Michigan, USA.  
*Facilitating Precision Mass Measurements at CARIBU* – submitted talk.
- Joint Institute for Nuclear Astrophysics Frontiers 2010. October 21-23, Lake Geneva, Wisconsin, USA.  
*CPT Mass Measurements at CARIBU* – submitted talk.
- American Physical Society April Meeting 2010. February 13-16, Washington, DC, USA.  
*Precision Mass Measurements at CARIBU* – submitted talk.
- Exotic Nuclei and Atomic Masses 2008. September 7-13, Ryn, Poland.  
*Mass Measurements of  $^{252}\text{Cf}$  Fission Fragments in the  $A=108-110$  Region* – submitted talk and poster.

## SEMINARS

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- *Cooling Highly Charged Ions Using TITAN's Cooler Penning Trap (CPET)*. January 2015, TRIUMF, Vancouver, British Columbia, Canada.
- *Mass Measurements on the r-Process Path*. June 2012, Argonne National Laboratory, Argonne, Illinois, USA.
- *Mass Measurements with the CPT at CARIBU*. May 2012, Argonne National Laboratory, Argonne, Illinois, USA.
- *R Process Mass Measurements with the CPT at CARIBU*. February 2012, Los Alamos National Laboratory, Los Alamos, New Mexico, USA.
- *From the Triangle Room to CARIBU: The status of r-process mass measurements with the CPT*. November 2010, Argonne National Laboratory, Argonne, Illinois, USA.
- *The Lindau Conference of Nobel Laureates*. August 2008, Argonne National Laboratory, Argonne, Illinois, USA.
- *Precision Mass Measurements of Astrophysically Important r-process Nuclei*. December 2006, Argonne National Laboratory, Argonne, Illinois, USA.

## SUMMER SCHOOLS

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- National Nuclear Physics Summer School 2009, Michigan State University, East Lansing, Michigan, USA.
- RIA Summer School 2007, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA.

## AWARDS

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- Represented Argonne National Laboratory as a member of the US Delegation at the 2008 Lindau Meeting of Nobel Laureates in Lindau, Germany.

## COMPUTING SKILLS

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- Operating Systems: DOS, Windows, Mac, UNIX and Linux.
- Programs and Languages: SolidWorks, Autodesk Inventor, AutoCAD, SimION, Office, C/C++, FORTRAN, COBOL II, SQL, BASIC, VisualBASIC, Python, Ladder Logic for Rockwell, Siemens and Schneider (Modicon) PLCs.

## REFERENCES

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- Prof. J. Dilling, TRIUMF/University of British Columbia, 4004 Wesbrook Mall, Vancouver BC V6T 2A3, Canada;  
*Phone:* +1 604-222-7413, *E-mail:* [jdilling@triumf.ca](mailto:jdilling@triumf.ca)
- Prof. R. Segel, Northwestern University/Argonne National Laboratory, Building 203, C-253, 9700 South Cass Avenue, Argonne, Illinois, 60439, USA;  
*Phone:* +1 847-624-4882, *E-mail:* [ralphsegel@yahoo.com](mailto:ralphsegel@yahoo.com)
- Prof. G. Savard, The University of Chicago/Argonne National Laboratory, Building 203, F-165, 9700 South Cass Avenue, Argonne, Illinois, 60439, USA;  
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