MICHAEL GENNARI

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EDUCATION, SCHOOLS AND AWARDS

University of Waterloo – *Candidate for Bachelors of Science*

- 4A Term Honours Co-operative Mathematical Physics (Double Degree Honors Physics and Applied Mathematics)
- Expected Graduation in 2019

President's Scholarship of Distinction – *University of Waterloo*

- Awarded an academic scholarship and separate research funding the equivalent of $1500 CAD to work in the Department of Physics and Astronomy at the University of Waterloo

RESEARCH EMPLOYMENT/EXPERIENCE

Theory Group, TRIUMF – Vancouver, BC Canada
Researcher in Theoretical Nuclear Physics – January 2017 to Present
Supervisor – Dr. Petr Navrátil

- Derived and implemented a nonlocal, translationally invariant nuclear density to be used in improving predictions of high energy nuclear reactions and density functional theory (DFT)
- Derived an expression for the kinetic density (DFT quantity) of nuclei to visualize the amplified effects of centre of mass removal in nuclear densities
- Collaborated with Dr. Matteo Vorabbi, using nonlocal translationally invariant nuclear density to compute accurate and more consistent optical potentials of light nuclei
- Constructed framework for natural orbitals basis by diagonalizing the scalar one-body density matrix, improving accuracy and convergence of calculations in the harmonic oscillator basis
- Performed analysis on modern nucleon-nucleon and three-nucleon chiral interactions

Department of Physics and Astronomy, University of Waterloo – Waterloo, ON Canada
Volunteer Astrophysics Research Project – October 2016 to May 2017
Supervisor – Dr. James Taylor

- Worked on determining bound group structure of galaxies in the local volume by using friends-of-friends algorithm on data from the Karachentsev Local Volume Catalogue
- Attempted to calculate probabilities that major galaxies dominate their respective groups, thus associating dark matter halos with each dominant galaxy

CONFERENCES, WORKSHOPS AND PRESENTATIONS

Data Science and Quantum Computing Workshop (TRIUMF, Vancouver – S18)
- Workshop dedicated to exploring how machine learning and quantum computing can be used to enhance research output in high performance and large-scale computing

WestGrid Research Computing Summer School (University of British Columbia, Vancouver – S18)
- Summer school covering introductory and advanced topics in high performance and cloud computing, parallel programming (FORTRAN, C, Python), parallelizing GPUS with CUDA, and scientific visualization

10th International Conference on Direct Reactions with Exotic Beams (Matsue, Japan – S18)
- Presented poster on nuclear densities at DREB 2018, a conference devoted to the latest experimental and theoretical research in nuclear reactions with exotic nuclei

Nuclear Science Summer School (Michigan State University, East Lansing – S18)
- Summer school covering introductory topics in nuclear physics such as experimental techniques, modern detectors, and recent advancements in theoretical work

Progress in Ab Initio Techniques in Nuclear Physics (TRIUMF – W17 and W18)
- Attended and presented at workshop focused on new developments in *ab initio* nuclear theory such as progress in first-principles nuclear structure and reaction calculations, and latest developments in construction of accurate nucleon-nucleon and three-nucleon interactions

American Physical Society Division of Nuclear Physics (Pittsburgh – F17)
- Conference experience for undergraduate students who have conducted research in nuclear physics, providing them the opportunity to present their research to the larger professional community

Advisory Committee on TRIUMF – Parallel Theory Group Session (TRIUMF – W17, F18, W18)
- Theory group presentation to National Research Council of Canada on nonlocal translationally invariant nuclear density and kinetic densities

PUBLICATIONS (SEE STATUS)

Microscopic optical potentials derived from ab initio translationally invariant nonlocal one-body densities
Michael Gennari, Matteo Vorabbi, Angelo Calci, and Petr Navrátil. Phys. Rev. C 97, 034619

Kinetic density derived from ab initio nonlocal one-body densities (STATUS: in progress)
Michael Gennari, Angelo Calci, and Petr Navrátil

TEACHING EXPERIENCE

Guelph - Humber Math Centre – January 2016 to April 2016
Math Centre Staff

- Primarily worked as a mathematics, physics, and engineering tutor for the Math Centre
- Successfully conveyed challenging concepts in academia during both one on one and group tutoring sessions at the centre
- Collected data on the effectiveness of math centre tutoring and advertising strategies to determine the most effective teaching and promotion techniques

Department of Physics and Astronomy, University of Waterloo – September 2015 to Present
Physics Interconnected Mentor

- Volunteered in the Department of Physics and Astronomy by assisting with a first-year mentorship and tutoring program for incoming physics majors
- Met on a weekly basis with multiple students for approximately one hour to provide academic and community support

TECHNICAL SKILLS

- Extensive knowledge of high performance scientific computation using FORTRAN, Python, and minor experience with R
- Experience with parallelization of codes in FORTRAN using OpenMP
- Experienced with utilizing external computing grids for calculations, such as Cougar (TRIUMF), Cedar (Simon Frasier University), and Oak (University of British Columbia)
- Familiar with Linux based operating systems and shell scripting
- Other minor experience includes HTML, CSS, JavaScript (with AngularJS framework), and C++

AWARDS AND HONOURS

President's Scholarship of Distinction, 2014 to 2015 – *University of Waterloo*

- Awarded an academic scholarship of $2000 CAD
- Awarded separate research funding to the equivalent of $1500 CAD to work in the Department of Physics and Astronomy at the University of Waterloo

Distinction in Science, 2014 – *Saltfleet District High School*

- Awarded an academic scholarship of $400 CAD

Distinction in Mathematics, 2014 – *Saltfleet District High School*

- Awarded an academic scholarship of $300 CAD

ACADEMIC REFERENCES

- Dr. Petr Navrátil – *Theory Group, TRIUMF*
  - navratil@triumf.ca
- Dr. Matteo Vorabbi – *Theory Group, TRIUMF*
  - mvorabbi@triumf.ca
- Dr. Anna McCoy – *Theory Group, TRIUMF*
  - amccoy@triumf.ca
- Dr. Angelo Calci
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