HANANIEL SETIAWAN

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Medical Physics Graduate Program
Duke University
National Superconducting Cyclotron Laboratory
Michigan State University (2013-2017)

EDUCATION

Ph. D., Medical Physics, Duke University, Durham NC, USA (in progress) 8/2017 - Present
B. S., Physics (Honors), Michigan State University, East Lansing MI, USA 2017
Universität Zürich (UZH), Zürich, Switzerland (Frühjahrssemester 2017)
A. S., Engineering Physics/Mathematics, Lansing Community College, Lansing MI, USA 2014

MAIN RESEARCH AND WORK EXPERIENCES

Pion Production Simulations for Symmetry Energy Studies
National Superconducting Cyclotron Laboratory (NSCL) 5/2013-Present
Prof. ManYee Betty Tsang
Symmetry Energy Project and SPiRIT International Collaboration

1. Performed simulations of heavy ion collisions using Boltzmann-Uehling-Uhlenbeck Transport code and developed several analysis programs to determine the effect of Nuclear Symmetry Energy to pion production in high density nuclear region (*Phys. Rev. C.* **95**, 044614 (2017))
2. Assisted in the design and construction of the SAMURAI Pion Reconstruction and Ion Tracker (SPiRIT) time-projection chamber, using Autodesk Inventor to draw parts of the TPC that were then submitted to the machine shop and installed to the apparatus.
3. Contributed to nuclear physics experiments using the High Resolution Array (HiRA) detector at NSCL
4. Maintained the Symmetry Energy Project Collaboration, SPiRIT Outreach, and the NSCL Library websites.

Discretization of LCLS FEL Tapering to Optimize X-ray Power with Simulated Annealing Method
Stanford University, SLAC National Accelerator Laboratory 6/2016-12/2016
Dr. Juhao Wu
Linac Coherent Light Source (LCLS/LCLS-II)

1. Successfully attempted to discretize the tapering of the undulator magnets using both Markov Chain Monte Carlo (Simulated Annealing), as well as genetic algorithm in MATLAB environment to improve the X-ray power of SLAC's LCLS Free Electron Laser
2. Using Genesis 1.3 to simulate LCLS, the result includes an improvement of more than 40% increase of peak power and general trends to be studied (*Nucl. Instr. Meth. Phys. Res. A* **846**, 56-63 (2017))

The Design and Testing of the Half Wave Plate Rotator for the BLAST-TNG Telescope
Northwestern University, CIERA 6/2015-8/2015
Prof. Giles A. Novak
BLAST-TNG International Collaboration

1. Repurposed the SPARO cryostat, which had previously been used as a cryogenic instrument deployed at the South Pole, to be re-used for cold-testing of BLAST-TNG telescope's Half Wave Plate rotator, using SolidWorks to design the modification needed.
2. Developed a remote temperature monitoring system using a Silicon Diode thermometer, an Ethernet system, and C++ program
3. Volunteered to improve/revamp the Northwestern University Machine Shop's website

OTHER PROJECTS

1. **Experimental High Energy Physics (Supersymmetry - SUSY)**, Spring 2017
   Universität Zürich, Advisors: Prof. F. Canelli, Dr. C. Seitz
2. **Nanowire Sample Preparation of Transition Metal Dichalcogenides for STM/STS Studies**, Spring 2016
   MSU, Advisors: Prof. P. Zhang (Physics), T. Golubev (Physics)
3. **Cross-Sectional and Topological Analysis of Perovskite Photovoltaics Cells Using SEM**, Fall 2015
   MSU UGS200 Honors, Advisors: Prof. C. Boehlert (Materials Science), Dr. P. Askeland (Engineering)
4. **Three Species Population Dynamics using Modified Lotka-Volterra Equations**, Fall 2015
   MSU PHY415, Advisors: Prof. C. Murphy (Ecology), Profs. E. H. Simmons and R. S. Chivukula (Physics)
5. **Utilization of Euler's Method to Model Projectile Motion with MATLAB GUI**, Spring 2015
   MSU PHY321 Honors Project, Advisor: Prof. J. Pumplin (Physics)
6. **Independent Study in Nuclear Magnetic Resonance**, Spring 2014
   LCC, Advisors: Prof. J. Repko (Physics), Prof. D. Shane (Physics), Prof. E. Bryant (Chemistry)

EXTRACURRICULAR ACTIVITIES AND APPOINTMENTS

Ambassador and Campus Based Leader, *Gates Millennium Scholars Program* 5/2014-Present

- Recruited potential applicants for the GMS program, by visiting local high schools and present information about the scholarship.
- Reviewed applicants essay entries and application materials through essay workshops
- Mentored undergraduate scholars at Michigan State University to ensure academic success
- Planned and executed events for the GMS group at MSU

Senator, *the Academic Senate of Lansing Community College* 4/2013-6/2014

(Committee Assignments: Competitiveness & Innovation, Resource Management/Fiscal Responsibility, Election)

- Co-initiated and supported the creation of events, such as the annual International cafe, and the Centre of Engaged Inclusion, to support diversity efforts on-campus.
- Co-organized the 2013 Dumpster Diver event to promote recycling on-campus.
- Served in the Gateways to Completion pilot program, as a steering committee member, and provided inputs to decrease the DFWI (Drop-Fail-Withdraw-Incomplete) rates among students.
- Contributed to LCC's 2014 long-term Academic Master Plan through discussion/research with other senators.
- Attended college official ceremonies and outside events, such as the Lakeshore's 2014 Diversity Alliance Summit and Lansing Mayor's Ramadan Unity Dinner in 2013.
- Served in the Sustainability Advisory Committee to the President and the Multicultural Advisory Committee.

Outreach Volunteer, *Various Institutions* 5/2014-8/2017

- Presented nuclear science to local events and fairs, such as the MSU Physics and Astronomy Day in 2015 and 2016, on behalf of NSCL and the Joint Institute for Nuclear Astrophysics.
- Served as supervisor for Michigan Science Olympiad since 2013 (Region 11 and State-level competitions)
- Presented science concepts to elementary school students and supervised other volunteers on scientific content of their presentations during LCC Science & Mathematics Elementary Exploration in 2012 and 2013.
- Presented science/physics concepts to the public for MSU Science Festival in 2014.
- Volunteered as an assistant for the director for the Joint Institute for Nuclear Astrophysics-Physics of Atomic Nuclei summer physics program for high school science teachers and students in 2014.

OTHER EXTRACURRICULAR ACTIVITIES

Baritone/Bass, *Duke University Chapel Choir (Conductor: Dr. Rodney Wynkoop)* 2018-Present

Past concert: Mendelssohn's Elijah (March 4, 2018)

Upcoming concert: John Ferguson's Hymn Festival (April 8, 2018) and Mahler's Symphony #2 with the *Choral Society of Durham* (April 22, 2018)

Organ Studies, *Under the instruction of Dr. Robert Parkins, Duke University Organist* 2018-Present

Member, *Society of Duke Fellows* 2017-Present
Member, *MSU Nuclear Policy Working Group* 2015-2017
Member, *Society of Physics Student at MSU and Spartan Science Olympiad Club* 2015-2017
Member and Officer, *Lansing Community College International Club* 2011-2014
Member, *MSU and LCC Badminton Clubs* 2012-2017
Pianist, *Lansing Chinese Christian Church* 2010-2014

PUBLICATIONS

J. Wu, N. Hu, H. Setiawan, X. Huang, T.O. Raubenheimer, Y. Jiao, G. Yu, A. Mandlekar, S. Spampinati, C. Chu, J. Qiang, "Multi-Dimensional Optimization of a Terawatt Seeded Tapered Free Electron Laser with a Multi-Objective Genetic Algorithm." *Nucl. Instr. Meth. Phys. Res. A* **846**, 56-63 (2017)

M.B. Tsang, J. Estee, H. Setiawan, W.G. Lynch, J. Barney, M.B. Chen, G. Cerizza, P. Danielewicz, J. Hong, P. Morfouace, R. Shane, S. Tangwancharoen, K. Zhu, T. Isobe, M. Kurata-Nishimura, J. Lukasik, T. Murakami, and the SπRIT collaboration, "Pion Production in Rare Isotope Collisions." *Phys. Rev. C.* **95**, 044614 (2017)

PRESENTATIONS AND TALKS

1. May 2017, H. Setiawan, *The Search for the Supersymmetric Particles with the CMS Detector at the LHC*, **KU Leuven (Catholic University of Louvain) EuroScholars Midstay Program 2017**, Leuven/Louvain, Belgium
2. Aug 2016, H. Setiawan, J. Wu, *Discretization of LCLS FEL Tapering to Optimize X-ray Power Using Simulated Annealing Method*, **SLAC/Stanford Summer Research Symposium**, Menlo Park CA
3. Apr 2016, H. Setiawan, P. Zhang, P. Askeland, et al., *Cross-Sectional and Topological Analysis of Perovskite-based Photovoltaics Cell Using Scanning Electron Microscope*, **University Undergraduate Research and Arts Forum**, Michigan State University, East Lansing MI
4. Jan 2016, H. Setiawan, G. A. Novak, P. Ashton, et al., *The Design and Testing of the Half Wave Plate Rotator for the BLAST-TNG Telescope*, **American Astronomical Society 227th Meeting**, Kissimmee FL
5. Dec 2015, H. Setiawan, T. Gipson, M. James, M. Hill, K. Mireles, *College Financial Aid 101 and Overview of the Gates Millennium Scholars* Program, **East Lansing and Sexton High Schools**, Lansing MI
6. Nov 2015, H. Setiawan, M. B. Tsang, J. Estee, et al., *The Role of Nuclear Symmetry Energy in Heavy Ion Collisions*, **9th Undergraduate Physics Research Conference**, Wayne State University, Detroit MI
7. Aug 2015, H. Setiawan, G. A. Novak, P. Ashton, et al., *The BLAST-TNG Project: Repurposing the SPARO Cryostat for HWPr Cold-Testing*, **Adler Planetarium**, Chicago IL
8. Aug 2015, H. Setiawan, G. A. Novak, P. Ashton, et al., *The BLAST-TNG Project: Repurposing the SPARO Cryostat for HWPr Cold-Testing*, **Northwestern Summer REU Forum**, Evanston IL
9. Apr 2015, H. Setiawan, M. B. Tsang, R. Shane, et al., *Pion Production Simulations for Symmetry Energy Studies*, **University Undergraduate Research & Arts Forum**, Michigan State University, East Lansing MI
10. Dec 2014, H. Setiawan, C. Yang, S. Fenton, and G. J. Aponte, *College Financial Aid 101 and Overview of the Gates Millennium Scholars* Program, **Lansing Eastern and Sexton High Schools**, Lansing MI
11. Apr 2014, H. Setiawan, J. Repko, D. Shane, and E. Bryant, *Nuclear Magnetic Resonance: Theory and Application*, **Lansing Community College StarScapes Research and Art Forum**, Lansing MI

AWARDS, SCHOLARSHIPS, AND FELLOWSHIPS

Gates Millennium Scholar, Bill and Melinda Gates Foundation 2014-Present
James B. Duke Graduate Fellowship, Duke University 2017-Present
Duke University Scholars Program Fellowship, Duke University and Gates Foundation 2017-Present
EuroScholars Scholarship, EuroScholars 2017
Goldwater Honorable Mention, Goldwater Foundation 2016
MSU Honors College Dean's Research Scholar 2015
MSU College of Natural Science Dean's Research Scholar 2016

L. W. Hantel Endowed Fellowship, Department of Physics and Astronomy, MSU 2016
H. Tolles Scholarship, Department of Mathematics, MSU 2015
MSU Dean's List 2014-2017
First Place Award, MSU Undergraduate Research Forum-UURAF 2015
LCC President's List 2012-2014
All-Michigan Academic Team, Coca-Cola Scholars Foundation and Phi Theta Kappa 2014
Khan Academy Tutoring Challenge Honorable Mention 2014
J. Aldinger Scholarship, LCC Foundation 2013

PROFESSIONAL MEMBERSHIPS

American Astronomical Society 2015-2017
American Physical Society 2015-Present
FIRST Robotics Alumni Network 2014-Present
Joint Institute of Nuclear Astrophysics-Center for Evolution of Elements 2016-Present
Phi Theta Kappa Honor Society (Mu Tau Chapter Treasurer 2013-2014) 2012-Present
Society of Physics Students 2014-2017

SERVICE AND VOLUNTEERISM

Student Coordinator, *Duke Medical Physics Open House Fall 2017, Spring 2018* 2017-Present
Contributor, *Duke University Medical Physics Program Biweekly Newsletter/Newscast* 2017-Present
Contributor, *Duke Graduate School Professional Development Blog* 2017-Present
Volunteer, *Spartan Global Day of Service (Lansing Habitat for Humanity)* 2016
Re/Present Blog Contributor, *Asian Pacific Islanders American Scholarship Fund* 2014-Present
Nuclear Science Presenter, *MSU Physics and Astronomy Day and MSU Science Festival* 2015-2016
GED Tutor, *Capital Area Literacy Coalition* 2013-2015
Volunteer, *HOPE Lansing, Anti Trafficking Ministry* 2014
Co-chair, *LCC International Café Event* 2013-2014
Presenter and Volunteer, *LCC International Students Orientation* 2013-2014
Treasurer, *Phi Theta Kappa Mu Tau Chapter* 2013-2014
Volunteer and Fund-raiser, *Lansing Relay for Life* 2013-2014
Committee Member, *LCC Multicultural Committee* 2013
Committee Member, *LCC Sustainability Advisory Committee* 2012-2013
Volunteer, *2013 International Symposium on Nuclear Symmetry Energy* 2013
Volunteer, *Impression 5 Science Museum* 2012
Volunteer, *Spartan Stadium Concession for FBC Okemos* 2011-2016
Volunteer, *MSU World Languages Day* 2010

SKILLS

- English, Indonesian, Javanese (Native/Bilingual Proficiency), Mandarin, German (Beginner)
- General experience in MATLAB, Ms. Office. Also familiar with the UNIX shell environment
- Some experience with C++, Python, Solidworks, Autodesk Inventor, Adobe Photoshop/Dreamweaver, HTML, CSS, LaTeX, Topdrawer, CERN-root, Mathematica

REFERENCES (RESEARCH AND ACADEMIC)

Prof. M. Betty Tsang, Professor of Physics
National Superconducting Cyclotron Laboratory and Michigan State University
Phone: +1 (517) 908-7386
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Dr. Juhao Wu, Accelerator Physicist
SLAC National Accelerator Laboratory and Stanford University (U.S. Dept. of Energy SULI 2016)
Phone: +1 (650) 926-8673
Email: jhwu@slac.stanford.edu

Prof. Elizabeth H. Simmons, Executive Vice Chancellor for Academic Affairs and Professor of Physics
University of California at San Diego (formerly Dean and Professor at Michigan State University)
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Email: evc@ucsd.edu

Prof. Jaideep T. Singh, Assistant Professor of Physics
National Superconducting Cyclotron Laboratory and Michigan State University
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Prof. Giles Novak, Professor of Physics
Northwestern University (Summer 2015 Astrophysics REU)
Phone: +1 (847) 491-8645
Email: g-novak@northwestern.edu

Dr. Rebecca Shane, Research Scientist
Facility for Rare Isotope Beams
Phone: +1 (517) 908-7633
Email: shane@frib.msu.edu

REFERENCES (OUTREACH AND COMMUNITY SERVICE)

Dr. Zachary Constan, Outreach Coordinator
National Superconducting Cyclotron Laboratory
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Dr. Justin Micomonaco, Director of Assessment and Research
The Honors College at Michigan State University
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Dr. Olga Baranova, Program Coordinator
Duke University Medical Physics Graduate Program
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