

# HANANIEL SETIAWAN

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Medical Physics Graduate Program  
*Duke University*  
National Superconducting Cyclotron Laboratory  
*Michigan State University*

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## EDUCATION

<b>Ph. D.</b> , Medical Physics, Duke University, Durham NC, USA	(expected) 2022
<b>B. S.</b> , Physics (Honors), Michigan State University, East Lansing MI, USA	2017
<b>A. S.</b> , 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 (result of this work was submitted for publication in October 2016 to Phys. Rev. C)
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 (part of this work, along with other collaborators' results, were submitted and has been accepted for publication in Nucl. Inst. and Meth. A)

### 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 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. Pumplun (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 and Innovation, Resource Management/Fiscal Responsibility)
- 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-Present
- 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

- Member**, *MSU Nuclear Policy Working Group* 2015-Present
- Member**, *Society of Physics Student at MSU and Spartan Science Olympiad Club* 2015-Present
- Member and Officer**, *Lansing Community College International Club* 2011-2014
- Member**, *MSU and LCC Badminton Clubs* 2012-Present
- 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. Tangwanchaoen, K. Zhu, T. Isobe, M. Kurata-Nishimura, J. Lukasik, T. Murakami, and the S $\pi$ RIT 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 227<sup>th</sup> 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*, **9<sup>th</sup> 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 HWP 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 HWP 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

<b>Gates Millennium Scholar</b> , Bill and Melinda Gates Foundation	2014-Present
<b>James B. Duke Graduate Fellowship</b> , Duke University	2017-Present
<b>Duke University Scholars Program Fellowship</b> , Duke University and Gates Foundation	2017-Present
<b>EuroScholars Scholarship</b> , EuroScholars	2017
<b>Goldwater Honorable Mention</b> , Goldwater Foundation	2016
<b>MSU Honors College Dean's Research Scholar</b>	2015
<b>MSU College of Natural Science Dean's Research Scholar</b>	2016
<b>L. W. Hantel Endowed Fellowship</b> , Department of Physics and Astronomy, MSU	2016
<b>H. Tolles Scholarship</b> , Department of Mathematics, MSU	2015
<b>MSU Dean's List</b>	2014-Present
<b>First Place Award</b> , MSU Undergraduate Research Forum-UURAF	2015
<b>LCC President's List</b>	2012-2014
<b>All-Michigan Academic Team</b> , Coca-Cola Scholars Foundation and Phi Theta Kappa	2014
<b>Khan Academy Tutoring Challenge Honorable Mention</b>	2014
<b>J. Aldinger Scholarship</b> , LCC Foundation	2013

## PROFESSIONAL MEMBERSHIPS

American Association of Physicists in Medicine	2016-Present
American Astronomical Society	2015-Present
American Physical Society	2015-Present
Association for the Advancement of Sustainability in Higher Education	2012-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-Present

## SERVICE AND VOLUNTEERISM

<b>Volunteer</b> , <i>Spartan Global Day of Service (Lansing Habitat for Humanity)</i>	2016
<b>Re/Present Blog Contributor</b> , <i>Asian Pacific Islanders American Scholarship Fund</i>	2014-Present
<b>Nuclear Science Presenter</b> , <i>MSU Physics and Astronomy Day and MSU Science Festival</i>	2015-2016
<b>GED Tutor</b> , <i>Capital Area Literacy Coalition</i>	2013-2015
<b>Volunteer</b> , <i>HOPE Lansing, Anti Trafficking Ministry</i>	2014
<b>Co-chair</b> , <i>LCC International Café Event</i>	2013-2014
<b>Presenter and Volunteer</b> , <i>LCC International Students Orientation</i>	2013-2014
<b>Treasurer</b> , <i>Phi Theta Kappa Mu Tau Chapter</i>	2013-2014
<b>Volunteer and Fund-raiser</b> , <i>Lansing Relay for Life</i>	2013-2014
<b>Committee Member</b> , <i>LCC Multicultural Committee</i>	2013
<b>Committee Member</b> , <i>LCC Sustainability Advisory Committee</i>	2012-2013
<b>Volunteer</b> , <i>2013 International Symposium on Nuclear Symmetry Energy</i>	2013
<b>Volunteer</b> , <i>Impression 5 Science Museum</i>	2012
<b>Volunteer</b> , <i>Spartan Stadium Concession for FBC Okemos</i>	2011-Present
<b>Volunteer</b> , <i>MSU World Languages Day</i>	2010

## SKILLS

- English, Indonesian, Javanese (Native/Bilingual Proficiency), Spanish, Mandarin, German (Beginner)
- Extensive 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, TensorFlow
- Limited experience with Scanning Electron Microscopy (SEM) and Atomic-Force Microscopy (AFM)

## TRAININGS

### ***National Superconducting Cyclotron Laboratory:***

Radiation safety, Workplace safety, CPR/AED, Chainfall/overhead hoist basic, Work on equipment with >50V, >5mA, or >10J stored energy, and Science outreach training

### ***Northwestern University:***

Responsible Conduct of Research (RCR), RSG research/science communication training

### ***Gates Millennium Scholars Program:***

Leadership training as Campus Based Leader and Mentor (April 2015, Atlanta, GA)

### ***SLAC National Accelerator Laboratory:***

Workplace safety, Cyber-security and traffic safety

## REFERENCES (RESEARCH AND ACADEMIC)

**Prof. M. Betty Tsang**, Professor of Physics

National Superconducting Cyclotron Laboratory and Michigan State University

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**Prof. Elizabeth H. Simmons**, Univ Distinguished Professor, Associate Provost, & Dean of Lyman Briggs College

Michigan State University

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**Prof. Giles Novak**, Professor of Physics

Northwestern University

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**Dr. Rebecca Shane**, Diagnostic Research Scientist

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## REFERENCES (OUTREACH AND COMMUNITY SERVICE)

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