Duke UNIVERSITY

Hananiel Setiawan

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Education

Duke University — Durham, NC
PhD, Medical Physics — May 2022 (Expected)
Certificate in College Teaching
Relevant Coursework: Diagnostic Imaging, Clinical Practicum, Radiation Protection and Therapy, Data Science

Michigan State University — East Lansing, MI
BS (Honors), Physics — Aug 2017
Relevant Coursework: Quantum Physics, Nuclear and Particle Physics, Differential Equations, Python

Universität Zürich — Zürich, Canton Zürich, Switzerland
EuroScholars Research Student, Physics — Jan - Jun 2017
Relevant Coursework: Radiation Therapy Seminar (Profs. Uwe Schneider and Tony Lomax)

Lansing Community College — Lansing, MI
AS, Engineering Physics and Mathematics — May 2014
Relevant Coursework: Calculus, Classical and Modern Physics, Linear Algebra, MATLAB and C++

Research and Academic Experiences

Carl E. Ravin Advanced Imaging Laboratories, Duke University — May 2018 – Present
PhD Student and Graduate Research Assistant, Advisor: Prof. Ehsan Samei (Radiology)
Main Project Title: "Optimization and Personalization of Contrast-enhanced CT Imaging Protocol"

1. Research project revolves around optimization of contrast-enhanced CT scan protocol using specific patient's attributes such as height, weight, age, etc. (personalized medicine) using machine learning methods
2. Participated in Duke's Summer Doctoral Academy in 2018: Science Policy and Computation courses
3. Designed, organized, and created the Samei Group website during summer 2018

Physik-Institut, Universität Zürich and CERN — Jan – Jun 2017
EuroScholars Undergraduate Research Assistant, Advisor: Prof. Florencia Canelli (Particle Physics)
Main Project Title: "The Search for the Supersymmetric Particles with the CMS Detector at the LHC"

1. Completed 3,000+ CMS detector simulations of two different models of proton + proton collision, T1tttt and T5tttt, with two different gluino decay channels
2. Compared the final state products and kinematics of the simulations to explore potential Supersymmetry (SUSY) particle mass(es)

National Superconducting Cyclotron Laboratory, MSU — May 2013 – May 2017
Undergraduate Research Assistant, Advisor: Prof. M. Betty Tsang (Nuclear Physics)
Main Project Title: "Pion Production in Rare Isotope Collisions"

I was mainly involved in three projects:

1. Pion Production Simulation
   ▪ Completed 10,000+ simulations of different reactions (Sn-132+Sn-124, Sn-108+Sn-112, Ca-48+Ca-48, and others) to study pion production in nuclear collisions using pBUU transport code
   ▪ Analyzed result of simulations in ROOT/C++ environment to inform the effect of the Nuclear Symmetry Energy in nuclear high density regions, such as the neutron stars

2. SAMURAI Pion-Reconstruction and Ion Tracker (SPiRIT) Time Projection Chamber (TPC)
   ▪ Involved in some construction and testing activities, including designing the window of the TPC and gas-leak testing to ensure the quality of the enclosure
   ▪ Created CAD drawings and 3D models of TPC and experimental set-up
3. High Resolution Array (HiRA) Research
   ▪ Generally involved with experiments conducted with HiRA detector at NSCL, including maintenance and experimental set-up/clean-up
   ▪ Maintained and updated HiRA and Symmetry Energy Project group websites

SLAC Linear Accelerator Center at Stanford University Jun – Aug 2016
US Dept. of Energy Undergraduate Research Assistant, Advisor: Dr. Juhao Wu (Accelerator Physics)
Main Project Title: "Multi-Dimensional Optimization of a Terawatt Seeded Tapered Free Electron Laser"

1. Successfully discretized the undulator magnets tapering 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 Linac Coherent Light Source (LCLS) Free Electron Laser
2. Used Genesis 1.3 to simulate LCLS, the result includes an improvement of more than 40% increase of peak power

Center for Interdisciplinary Exploration & Research in Astrophysics, Northwestern University Jun – Aug 2015
NSF REU Undergraduate Research Assistant, Advisor: Prof. Giles Novak (Astronomy)
Main Project Title: "The BLAST-TNG Project: Repurposing the SPARO Cryostat for HWPr Cold-Testing"

1. Repurposed a cryostat, which had previously been used as a cryogenic instrument deployed at the South Pole, to be reused for cold-testing of BLAST-TNG (Ballon-borne Large-Aperture Submillimeter Telescope) 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++ programming

Skills

Language: English (Fluent), Indonesian (Native), Javanese-Arekan (Native), German (Beginner)
Computer: Familiar with MATLAB, HTML/CSS, UNIX, Adobe Dreamweaver, and Topdrawer. Some experience with Python, Autodesk Inventor (CAD), CERN-root, and LaTeX

Publications and Presentations

Peer-reviewed scientific journals:

1. J. Manfredi, J.H.C. Lee, W.G. Lynch, C.Y. Niu, M.B. Tsang, C. Anderson, J. Barney, K.W. Brown, Z. Chajecki, K.P. Chan, G. Chen, J. Estee, Z. Li, C. Pruitt, A.M. Rogers, A. Sanetullaev, H. Setiawan, R. Showalter, C.Y. Tsang, J.R. Winkelbauer, Z. Xiao, Z. Xu, "On Determining Dead Layer and Detector Thicknesses for a Position-sensitive Silicon Detector" *Nucl. Instr. Meth. Phys. Res. A* 888, 177-183 (2018)

2. 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)

3. 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)

Scientific presentations:

1. H. Setiawan, C. Seitz, "The Search for the Supersymmetric Particles with the CMS Detector at the LHC," *KU Leuven (Catholic University of Louvain) EuroScholars Symposium 2017*, Leuven, Belgium, May 2017 (Oral)
2. 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, Aug 2016 (Oral and Poster)
3. 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, Apr 2016 (Poster)
4. 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, Jan 2016 (Poster)
5. 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, Nov 2015 (Poster)
6. 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, Aug 2015 (Oral and Poster)
7. H. Setiawan, M. B. Tsang, R. Shane, et al., "Pion Production Simulations for Symmetry Energy Studies," *Univ. Undergraduate Research & Arts Forum*, Michigan State University, East Lansing MI, Apr 2015 (Poster)
8. 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, Apr 2014 (Poster)

Other publications and contributions:

Duke University Graduate School Professional Development Blog Contributor:

1. Alumni Profile Series: Yang Yang, Ph.D. (Google) - (02/01/2018)
2. Alumni Profile Series: Michael Kurilla, M.D., Ph.D. (National Institutes of Health) – (06/20/2018)

Honors, Awards, Scholarships, and Fellowships

Gates Millennium Scholar (2014-2022, *Bill and Melinda Gates Foundation*)
Director's Award for Exemplary Service (2018, *Duke Medical Physics Graduate Program*)
James B. Duke Graduate Fellowship (2017-2021, *The Graduate School at Duke University*)
University Scholars Program Graduate Fellow (2017-2022, *William H. Gates Foundation*)
EuroScholars Scholarship (2017, *EuroScholars Consortium*)
Dean's List (2014-2017, *Michigan State University*)
L.W. Hantel Endowed Fellowship (2016, *MSU Dept. Physics and Astronomy*)
Dean's Research Scholar (2015-2016, *MSU College of Natural Sciences and MSU Honors College*)
H. Tolles Scholarship (2015, *MSU Dept. Mathematics*)
First Place Award (2015, *MSU Undergrad Research Forum UURAF*)
All-Michigan Academic Team (2014, *Phi Theta Kappa and Coca-Cola Scholars Foundation*)
President's List (2012-2014, *Lansing Community College*)
J. Aldinger Scholarship (2013, *Lansing Community College Foundation*)

Service to Current and Past Academic Institutions

Committee Member (2019, *Duke University GradX 2019 Planning Committee – Society of Duke Fellows*)
Committee Member (2018-Present, *Duke University MLK Commemoration Planning Committee*)
Graduate Student Liaison (2018-Present, *Duke Graduate School Graduate Student Affairs*)
Mentoring (2014-Present, *Duke University and Michigan State University – 4 Undergraduates and 1 Graduate*)
Committee Member (2018-Present, *Duke Medical Physics Cultural Committee*)

PhD Representative (2018-2019, *Duke Medical Physics Student Leadership and Advisory Council*)
Teaching Assistant (2018 Responsible Conduct of Research Course for New PhD Students, *Duke University)*
Student Coordinator and Volunteer (2017-Present, *Duke Medical Physics Program Fall and Spring Open Houses*)
Contributor (2018-Present, *Duke Graduate School Professional Development Blog*)
Contributor (2017-Present, *Duke Medical Physics Biweekly Newscast*)
Volunteer (2015, *Improved the design & user-friendliness of the Northwestern University Machine Shop's Website*)
Presenter and Science Outreach Volunteer (2014-2017, *National Superconducting Cyclotron Laboratory*)
Presenter and Science Outreach Volunteer (2014-2017, *MSU College of Natural Sciences*)
Senator (2013-2014, *The Academic Senate of Lansing Community College*)
Committee Assignments: Competitiveness and Innovation, Resource Management and Fiscal Responsibility, and Election
Member (2013-2014, *LCC Gateways to Completion Pilot Program Steering Committee*)
Member (2013-2014, *LCC Multicultural Advisory Committee to the President)*
Member (2012-2014, *LCC Sustainability Advisory Committee to the President*)
Presenter and Science Outreach Volunteer (2012-2014, *LCC Science Department*)
Co-initiator and Co-organizer (2013 International Café, *Lansing Community College*)

Service to the Communities

Committee Member (2018-Present, *Duke Lutherans-Grace LCMS-St. Paul ELCA: Life Together at Grace House*)
Volunteer (2018, *Threshold Clubhouse Mental Health Facility, Durham, NC*)
Volunteer (2018, *Eno River Park Festival, Durham, NC*)
Officer and Librarian (2018-Present, *Duke University Chapel Choir and Schola Cantorum*)
Organizer/Presenter (2014-2016, *College Application & Scholarship Workshops – 4 Local HS, Greater Lansing, MI*)
Ambassador (2014-2017, *Gates Millennium Scholars Program*)
Campus Based Leader (2014-2016, *MSU Gates Millennium Scholar Campus Based Organization, East Lansing, MI*)
Contributor (2014, *Re/Present Blog by the Asian Pacific Islanders American Scholarship Fund*)
Volunteer (2014, *HOPE Anti Trafficking Ministry, Michigan*)
Event Supervisor (2013-2016, *Michigan State Science Olympiad, Greater Lansing, MI*)
GED Tutor (2013-2015, *Capital Area Literacy Coalition, Lansing MI*)
Treasurer (2013-2014, *Phi Theta Kappa Mu Tau Chapter*)
Fundraiser and Organizer (2012-2014, *Relay for Life, Lansing MI*)

Professional Memberships

American Astronomical Society
American Physical Society
American Association for the Advancement of Science
American Association for Physicists in Medicine
FIRST Robotics Alumni Network
Gates Millennium Scholars Alumni Network
International Society for Optics and Photonics (SPIE)
Joint Institute of Nuclear Astrophysics
Phi Theta Kappa, Community College Honor Society

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References

Academic

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Ehsan Samei, Ph.D., *Professor of Radiology, Medical Physics, Physics, BME, and ECE and Chief Medical Physicist*
Duke University and Duke University Medical Center
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Elizabeth H. Simmons, Ph.D., *Executive Vice Chancellor for Academic Affairs and Professor of Physics*
University of California at San Diego (formerly Dean and Professor at Michigan State University)
Email: evc@ucsd.edu

Juhao Wu, Ph.D., *Accelerator Physicist*
SLAC National Accelerator Laboratory and Stanford University (U.S. Dept of Energy SULI 2016)
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Service/Outreach

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