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, Academic, and Professional Experiences

**Carl E. Ravin Advanced Imaging Laboratories, Dept. Radiology, Duke University** — May 2018 – Present
*PhD Student and Graduate Research Assistant*, Advisor: Prof. Ehsan Samei (Radiology)
Main Project: Contrast dynamics modelling in human and contrast-enhanced CT protocol personalization

1. Research project revolves around building a machine learning-based contrast dynamics model utilizing a library of patient images from Duke University Medical Center
2. The model will potentially be used to improve current clinical protocol to personalize contrast administration protocol in a contrast-enhanced CT scan
3. In addition, the resulting model will be applied to the XCAT anthropomorphic digital phantom library
4. Participated in Duke University Summer Doctoral Academy: Science Policy and Research Computing (Summer 2018), Negotiation and Intro to Health Care Policy (Summer 2019)
5. Designed, organized, and created the Samei Group website during summer 2018

**American Cancer Society Cancer Action Network (ACS CAN)** — August 2019 - Present
*National Gen2End Research Program Engagement Lead Volunteer*
*Legislative Ambassador for NC-01 Congressional District*

1. Collaborate with ACS staff in the office of the Chief Medical and Scientific Officer in developing and executing engagement strategies to increase collaboration between ACS-funded researchers and other stakeholders
2. Participated in lobbying activities at the U.S. Capitol and NC State Capitol to push for increased NIH funding, passage of cancer prevention/treatment, healthcare workforce development, anti-Tobacco, and patient advocacy bills.
3. Maintain constant communication with local elected officials in NC District 1 and wrote letters to the editor to the local media to support cancer-related initiative or passage of a bill.

**Graduate and Professional Student Council (GPSC), Duke University** — April 2019 – April 2020
*Director of Operations and Chair of the Operations Committee*

1. Coordinated the logistics required for the General Assembly and Executive Committee meetings

2. Served, ex-officio, on the GPSC Community Pantry Committee and GPSC Emergency Travel Committee
3. Managed and maintained the day-to-day operations of GPSC-owned facilities, including the GPSC House
4. Successfully divested 75% of purchases made by the GPSC from non-local businesses to local Durham businesses
5. Reduced single-use plastic purchases by half in Fall 2019, with the goal of zero usage by Fall 2020
6. Served as member of the Student Health Insurance Advisory Council (SHIAC) which advised the Dean of Student Affairs on student health insurance matters, including meeting with different stakeholders and voting on premium/benefit changes.
7. Participated in the GPSC Legislative Action Days in Washington D.C., in collaboration with the National Association of Graduate and Professional Student, to advocate for graduate/professional student concerns to elected officials, including financial aid, visa, and mental health.

**Physik-Institut, Universität Zürich and CERN** January – June 2017

*EuroScholars Undergraduate Research Assistant*, Advisor: Prof. Florencia Canelli (Particle Physics)
Main Project: "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: "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

**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: "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: "The BLAST-TNG Project: Repurposing the SPARO Cryostat for HWPr Cold-Testing"

4. 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
5. 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. H. Setiawan, E. Abadi, F. Ria, W. Fu, T.B. Smith, E. Samei, "Modeling patient-informed liver contrast perfusion in contrast-enhanced CT imaging" (submitted for publication, 2020)

2. J. Manfredi, J.H.C. Lee, A.M. Rogers, M.B. Tsang, W.G. Lynch, C. Anderson, J. Barney, K.W. Brown, B. Brophy, G. Cerizza, Z. Chajecki, G. Chen, J. Elson, J. Estee, H. Iwasaki, C. Langer, Z. Li, C. Loelius, C.Y. Niu, C. Pruitt, H. Setiawan, R. Showalter, K. Smith, L.G. Sobotka, S. Sweany, S. Tangwancharoen, J.R. Winkelbauer, Z. Xiao, Z. Xu, "Quenching of Single Particle Strengths in Direct Reactions" (submitted for publication, 2020)

3. 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)

4. 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)

5. 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)

*Conference proceedings:*

1. H. Setiawan, E. Abadi, W. Fu, T.B. Smith, E. Samei, "Patient-informed and Physiology-based Modelling of Contrast Dynamics in Cross-sectional Imaging" *Proc. SPIE 10948: Physics of Medical Imaging,* 109485Y (2019)

*Scientific presentations:*

1. H. Setiawan, E. Abadi, W. Fu, F. Ria, T.B. Smith, E. Samei, "Patient-informed and Physiology-based Modelling of Contrast Dynamics in Contrast-enhanced CT Imaging," *SPIE Medical Imaging,* Houston TX, Feb 2020 (Oral)
2. H. Setiawan, E. Abadi, W. Fu, T.B. Smith, E. Samei, "Patient-informed and Physiology-based Modelling of Contrast Dynamics in Cross-sectional Imaging," *Duke University Medical Center Radiation Oncology and Imaging Program Annual Retreat,* Durham NC, Mar 2019 (Poster)
3. H. Setiawan, E. Abadi, W. Fu, T.B. Smith, E. Samei, "Patient-informed and Physiology-based Modelling of Contrast Dynamics in Cross-sectional Imaging" *International Society for Optics and Photonics (SPIE) Conference: Physics of Medical Imaging,* San Diego CA, Feb 2019 (Poster)

4. 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)
5. 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)
6. 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)
7. 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$^{th}$ Meeting*, Kissimmee FL, Jan 2016 (Poster)
8. H. Setiawan, M. B. Tsang, J. Estee, et al., "The Role of Nuclear Symmetry Energy in Heavy Ion Collisions," *9$^{th}$ Undergraduate Physics Research Conference*, Wayne State University, Detroit MI, Nov 2015 (Poster)
9. 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)
10. 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)
11. 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*)
**James T. Dobbins Leadership Award** (2019, *Duke Medical Physics Graduate Program*)
**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 Recipient** (2017-2022, *Duke University, Bill and Melinda 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*)

*Conference Travel scholarships:*
1. Gates Millennium Scholarship Leadership Academy for Campus-based Leaders (April 16-19, 2015, Atlanta GA)
2. American Cancer Society Cancer Action Network Lobbying Day (September 8-11, 2019, Washington DC)
3. Asian Pacific Islanders American (APIA) Scholars Leadership Academy "ELEVATE" (September 12-15, 2019, Washington DC)
4. National Association of Graduate and Professional Student (NAGPS) Legislative Action Days (September 27-30, 2019, Washington DC)

5. Asian Pacific Islanders American (APIA) Scholars Young Professionals Conference (March 26-29, 2020, Los Angeles – Cancelled due to COVID-19)

## Service to Current and Past Academic Institutions

**Graduate Consul**, *Duke University Scholars Program – USP* (2019-2020)
**Member**, *NC Campus Pantry Collaboration, Duke-UNCCH-NCSU-NCCU-DurhamTech* (2019-Present)
**Committee Member**, *Duke University Martin Luther King Commemoration Planning Committee* (2018-Present)
**Lead Teaching Assistant**, *Responsible Conduct of Research Course for New PhD Students, Duke University* (2019)
**Committee Member**, *Duke University GradX 2019 Planning Committee – Society of Duke Fellows* (2019)
**Graduate Student Liaison**, *Duke Graduate School Graduate Student Affairs* (2018-Present)
**Primary Organizer**, *Duke University Fall 2018 Medical Physics Residency Panel* (2018)
**Mentor**, *Duke University and Michigan State University – 4 Undergraduates and 1 Graduate*
**Committee Member**, *Duke Medical Physics Culture Committee* (2018-2019)
**PhD Representative**, *Duke Medical Physics Student Leadership and Advisory Council* (2018-2019)
**Teaching Assistant**, *Responsible Conduct of Research Course for New PhD Students, Duke University* (2018)
**Student Coordinator and Volunteer**, *Duke Medical Physics Program Fall and Spring Open Houses* (2017-2019)
**Contributor**, *Duke Graduate School Professional Development Blog* (2018-Present)
**Contributor**, *Duke Medical Physics Biweekly Newscast* (2017-Present)
**Volunteer**, *Improved the design & user-friendliness of the Northwestern University Machine Shop's Website* (2015)
**Presenter and Science Outreach Volunteer**, *National Superconducting Cyclotron Laboratory* (2014-2017)
**Presenter and Science Outreach Volunteer**, *MSU College of Natural Sciences* (2014-2017)
**Senator**, *The Academic Senate of Lansing Community College* (2013-2014)
Committee Assignments: Competitiveness and Innovation, Resource Management/Fiscal Responsibility, and Election
**Member**, *LCC Gateways to Completion Pilot Program Steering Committee* (2013-2014)
**Member**, *LCC Multicultural Advisory Committee to the President* (2013-2014)
**Member**, *LCC Sustainability Advisory Committee to the President* (2012-2014)
**Presenter and Science Outreach Volunteer**, *LCC Science Department* (2012-2014)
**Co-initiator and Co-organizer**, *International Café, Lansing Community College* (2013)
**Fundraiser and Officer**, *FIRST Robotics Team 4294, The Early College at Lansing Community College* (2011-2013)

## Service to the Communities

**Coordinator for Congregational Care**, *the Congregation at Duke Chapel, Church Council* (2019-2020)
**Board Member**, *Duke University Chapel National Advisory Board, Durham NC* (2019-2022)
**North Carolina Delegate**, *American Cancer Society Cancer Action Network Lobbying Day, Washington DC* (2019)
**Judge, Physics and Mathematics Section**, *North Carolina Science and Engineering Fair*, *Raleigh NC* (2019)
**Volunteer**, *Hillandale Elementary School Science Day, Durham NC* (2018-Present)
**Volunteer**, *Threshold Clubhouse, Durham NC* (2018)
**Volunteer**, *Eno River Park Festival, Durham NC* (2018, 2019)
**Chorister and Librarian**, *Duke University Chapel Choir* (2018-Present)
Concerts: Mendelssohn's Elijah (S'18), Mahler's Symphony No. 2 in C Minor (S'18), Handel's Messiah (F'18, F'19), Bach's St. Matthäus Passion (S'19), The Marvel of This Night CBS Special (F'19)
**Organizer/Presenter**, *College Application & Scholarship Workshops – 4 Local HS, Greater Lansing MI* (2014-2016)
**Ambassador**, *Gates Millennium Scholars Program* (2014-2017)
**Campus Based Leader**, *MSU Gates Millennium Scholar Campus Based Organization, East Lansing MI* (2014-2016)
**Contributor**, *Re/Present Blog by the Asian Pacific Islanders American Scholarship Fund* (2014)

**Volunteer**, *HOPE Anti Trafficking Ministry, Michigan* (2014)
**Event Supervisor**, *Michigan State Science Olympiad, Greater Lansing, MI* (2013-2016)
**GED Tutor**, *Capital Area Literacy Coalition, Lansing MI* (2013-2015)
**Treasurer**, *Phi Theta Kappa Mu Tau Chapter* (2013-2014)
**Fundraiser and Organizer**, *Relay for Life, Lansing MI* (2012-2014)

## Professional Memberships

American Association for the Advancement of Science
American Association for Physicists in Medicine
American Cancer Society – Cancer Action Network and Gen2End
American Physical Society
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