618 South Main Street, #607
Ann Arbor, MI 48104
(805) 490-6473

E-mail: jbudhu@umich.edu
Website: www.jordanbudhu.com

# JORDAN BUDHU

**Postdoctoral Research Fellow – Radiation Laboratory**
University of Michigan –Since January 2019
Radiation Laboratory-Electromagnetic Metamaterials Laboratory
Principle Investigator Prof. Anthony Grbic

## EDUCATION

**Doctor of Philosophy in Electrical Engineering- Physical and Wave Electronics**
University of California, Los Angeles, Graduated—Fall 2018
UCLA Antenna, Research, Analysis, and Measurement Laboratory
Under Advisement of Prof. Yahya Rahmat-Samii

**Master of Science in Electrical Engineering- Microwave and Antenna Engineering**
California State University, Northridge, Graduated—May 2010 *with Distinction*
Under Advisement of Prof. Sembiam Rengarajan

**Bachelor of Science in Electronics Engineering Technology**
Devry University, Graduated—February 2006 *Magna Cum Laude*

## AWARDS AND HONORS

- **2019 First Place USNC-URSI Ernst K. Smith Student Paper Competition Award**
- **2018 UCLA Henry Samueli School of Engineering Excellence in Teaching Award**
- **2012 First Place Best Poster Award at the 2012 IEEE Coastal Los Angeles Class-Tech Meeting.**
- **2010 UCLA Eugene Cota-Robles Fellowship**
- **2005 First Place Award / Undergraduate Senior Project**

## RESEARCH EXPERIENCE

**Postdoctoral Research –** Metamaterials, Metasurfaces, Reflectarrays, Dielectric Resonantor Antenna Coupled Infrared Photodetectors

**Graduate Ph.D. Dissertation --** Numerical Synthesis Algorithms for Next Generation Spaceborne Wind Scatterometer and CubeSat Antennas

**Graduate Master's Thesis –** Investigations into Reflectarray Design Using the Infinite Array Approximation

**Undergraduate Senior Project –** Automatic Automobile Oil Change System

## TEACHING EXPERIENCE

**University of Michigan** **January 2021- May 2021**
*LEO Intermittent Lecturer*
Primary Instructor for Winter 2021 semester (EECS430 Wireless Link Design).

**University of Michigan** **January 2020- May 2020**
*LEO Intermittent Lecturer*
Primary Instructor for Winter 2020 semester (EECS430 Wireless Link Design).

**University of California Los Angeles** **September 2018- December 2018**
*Teaching Fellow*
Teaching Fellow position for Fall 2018 quarter (EE101A Electromagnetic Wave).

**University of California Los Angeles** **January 2018- March 2018**
*Teaching Associate*
Teaching Associate position for Winter 2018 quarter (EE101A Electromagnetic Wave).

**University of California Los Angeles** **March 2017- June 2017**
*Teaching Associate*
Teaching Associate position for Spring 2017 quarter for EE162A Communication Systems and Antennas.

**University of California Los Angeles** **January 2017- March 2017**
*Teaching Associate*
Teaching Associate position for Winter 2017 quarter for EE101B Electromagnetic Wave.

**University of California Los Angeles** **September 2012-December 2012**
*Teaching Assistant*
Teaching Assistant position for Fall 2012 quarter for EE1 Electrical Engineering Physics.

**University of California Los Angeles** **March 2012- June 2012**
*Teaching Assistant*
Teaching Assistant position for Spring 2012 quarter for EE162A Communication Systems and Antennas.

**California State University Northridge** **January 2010-July 2010**
*Teaching Assistant*
Teaching assistant for the course ECE 371 for Electromagnetic Fields and Wave I for the Spring semester.

**Frog Tutoring** **January 2017-Present**
*Engineering, Physics, and Mathematics Tutor*
Tutoring kids from K-12 all the way up to Graduate School in various subject areas such as Mathematics, Geometry, Physics, and Engineering.

**BookAnyone Online Tutoring** **June 2018-Present**
*Advanced Math Science Engineering Tutor*
Tutoring kids from K-12 all the way up to Graduate School in various subject areas such as Mathematics, Geometry, Physics, and Engineering.

**Ingenius Academic Prep Mentoring** **Jan 2019-Present**
*Academic Mentor*
Mentorship role in one-on-one project development with a student hand selected by their academic institution to participate in the program. An 8-week project is planned, executed, and presented by the student and I in complex engineering or computer science topics.

## INDUSTRY EXPERIENCE

**NASA Jet Propulsion Laboratory** **June 2012—September 2012**
*Summer Intern III, Spacecraft Antennas Group*
Antenna design, analysis, and characterization for the Surface Water Ocean Topography (SWOT) satellite.

**NASA Jet Propulsion Laboratory** **July 2011—October 2011**
*Summer Intern III, Spacecraft Antennas Group*
Antenna design, analysis, and characterization for the Surface Water Ocean Topography (SWOT) satellite.

**Meggitt Safety System Inc.** **October 2006—September 2010**
*Software Engineer*
Design, Implement, and Test DO-178B compliant embedded software for avionics platforms.

**Lucix Cooperation** **March 2006—October 2006**
*Engineering Technician*
Testing of microwave phase locked oscillators and test/tuning of microwave hybrid amplifiers.

**Meggitt Safety Systems Inc.** **November 2005— March 2006**
*Engineer Intern*
Interning as an Engineer assisting coworkers on various projects.

## PUBLICATIONS

**Journal Papers:**

**Jordan Budhu** and Yahya Rahmat-Samii, Richard E. Hodges, Douglas C. Hoffman, Donald F. Ruffatto, Kalind C. Carpenter,

"Three-Dimensionally Printed, Shaped, Engineered Material Inhomogeneous Lens Antennas for Next-Generation Spaceborne Weather Radar Systems," in IEEE Antennas and Wireless Propagation Letters, vol. 17, no. 11, pp. 2080-2084, Nov. 2018.

**Jordan Budhu** and Yahya Rahmat-Samii, "A Novel and Systematic Approach to Inhomogeneous Dielectric Lens Design Based on Curved Ray Geometrical Optics and Particle Swarm Optimization," in IEEE Transactions on Antennas and Propagation, vol. 67, no. 6, pp. 3657-3669, June 2019.

**Jordan Budhu** and Yahya Rahmat-Samii, "3D-Printed Inhomogeneous Dielectric Lens Antenna Diagnostics: A Diagnostic Tool for Assessing Lenses Misprinted Due to Fabrication Tolerances," in IEEE Antennas and Propagation Magazine, vol. 62, no. 4, pp. 49-61, Aug. 2020.

**Jordan Budhu** and Anthony Grbic, "Perfectly Reflecting Metasurface Reflectarrays: Mutual Coupling Modelling Between Unique Elements Through Homogenization," in IEEE Transactions on Antennas and Propagation, doi: 10.1109/TAP.2020.3001450.

**Jordan Budhu**, Eric Michielssen, and Anthony Grbic, "On the Design of Dual Band Mulitlayer Stacked Metasurfaces Using Integral Equations," – Under Review in IEEE Transactions on Antennas and Propagation, November 2020.

**Jordan Budhu,** Nicole Pfiester, Kwong-Kit Choi, Steve Young, Chris Ball, Sanjay Krishna, and Anthony Grbic, "Dielectric Resonator Antenna Coupled Antimonide-Based Detectors (DRACAD) for the Infrared," – Under Review in IEEE Transactions on Antennas and Propagation, July 2020.

Malik Almunif, Waleed Alomar, **Jordan Budhu**, and Anthony Grbic, "A Bianisotropic Metasurface for Focusing Between Regions of High Dielectric Contrast," – Under Review in IEEE Transactions on Antennas and Propagation, August 2020.

**Conference Papers:**

**Jordan Budhu** and Yahya Rahmat-Samii, "Understanding the Appearance of Specular Reflections in Offset Fed Reflectarray Antennas." – Presented at the Reflectarray Antennas special session of the IEEE Antennas and Propagation Society (APS) Conference of 2011 in Spokane, Washington.

**Jordan Budhu** and Yahya Rahmat-Samii, "Characterizing Specular Reflections in Offset Fed Reflectarray Antennas." – Electrical Engineering Department Annual Research Review, University of California, Los Angeles, March 2011

**Jordan Budhu** and Yahya Rahmat-Samii, " Offset Fed Reflectarray Antennas: A Closer Look At How To Remedy Specular Reflection." – IEEE Coastal Los Angeles Annual Meeting, October 2012. *Won First Place Prize for Best Poster*

**Jordan Budhu** and Yahya Rahmat-Samii, "An Efficient Spectral Domain Method of Moments for Reflectarray Antennas using a Customized Impedance Matrix Interpolation Scheme." – Presented at the Numerical Methods Session of the 2013 National Radio Science Meeting (NRSM) in Boulder, Colorado.

**Jordan Budhu** and Yahya Rahmat-Samii, "On Efficiency Improvements for the Spectral Domain Method of Moments Through Various Schemes of Impedance Matrix Interpolations." – presented at the July 2013 IEEE Antennas and Propagation Society Annual Meeting in Chicago, Illinois.

**Jordan Budhu** and Yahya Rahmat-Samii, "Synthesizing Thin Dielectric Lenses for Conical Scanning Beams: A Hybrid Numerical Algorithm." – Presented at the Emerging Computation Methods Special Session of the 2017 National Radio Science Meeting (NRSM) in Boulder, Colorado.

**Jordan Budhu** and Yahya Rahmat-Samii, "Synthesis of 3D-Printed Dielectric Lens Antennas Via Optimization of Geometrical Optics Ray Tracing." – presented at the July 2017 IEEE Antennas and Propagation Society Annual Meeting in San Diego, California.

Rahmat-Samii, Y., Kovitz, J.M., **Budhu, J.**, Manohar, V., "A Novel Near-field Gregorian Reflectarray Antenna Design with a Compact Deployment Strategy for High Performance CubeSats", AMTA Conference, Atlanta, GA, October 2017

**Jordan Budhu** and Yahya Rahmat-Samii, "Shaped, Thin Luneburg-Like Lens Antennas Optimized for Conical beam Scans with Ring-Type Focus."– Electrical Engineering Department Annual Research Review, University of California, Los Angeles, March 2017

**Jordan Budhu** and Yahya Rahmat-Samii, " Shaped-Profiled and Material-Engineered Inhomogeneous Lens Antennas: GO Curved Ray Tracing and Aperture Fields." – presented at the January 2018 National Radio Science Meeting (NRSM) in Boulder, Colorado.

**Jordan Budhu** and Yahya Rahmat-Samii, "A Novel GO-PSO Algorithm for Designing 3D-Printed Optimized Pixelized Inhomogeneous and Shaped-Profiled Lens Antennas", AMTA Conference, Atlanta, GA, October 2018

Vignesh Manohar, **Jordan Budhu**, and Yahya Rahmat-Samii, "Representative Low-Profile Gregorian Reflector Antenna Designs with a Compact Depolyment Strategy for Emerging CubeSats", – presented at the January 2019 National Radio Science Meeting (NRSM) in Boulder, Colorado

**Jordan Budhu** and Yahya Rahmat-Samii, "A New 3D-Printed Electronically Scanned Spinning Spot Beam Inhomogeneous Dielectric Lens Antenna for Spaceborne Wind Scatterometer Weather Radar Satellites", – presented at the January 2019 National Radio Science Meeting (NRSM) in Boulder, Colorado. *First Place Award Student Paper Competition*

**Jordan Budhu** and Yahya Rahmat-Samii, " A Novel Diagnostics Method for Determining the Unknown Permittivity Profile of 3D Printed Lenses." – presented at the July 2019 IEEE Antennas and Propagation Society Annual Meeting in Atlanta, Georgia.

Yahya Rahmat-Samii, **Jordan Budhu**, Richard E. Hodges, D. C. Hoffman, and Don Ruffatto, " A Novel 60-cm Nonsherical 3-D Printed Voxelized Lens Antenna: Design, Fabrication and Measurement." – presented at the July 2019 IEEE Antennas and Propagation Society Annual Meeting in Atlanta, Georgia.

**Jordan Budhu** and Anthony Grbic, "A Rigorous Approach to Designing Reflectarrays", --presented at the 23rd International Conference on Electromagnetics and Communications (ICECOM) in Dubrovnik, Croatia, October 2019.

**Jordan Budhu**, Anthony Grbic, and Eric Michielssen, "Design of Multilayer, Dualband Metasurface Reflectarrays" – presented at the March 2020 European Conference on Antennas and Propagation (EuCAP) Annual Meeting in Copenhagen, Denmark.

**Jordan Budhu**, Eric Michielssen, and Anthony Grbic, " Dualband Stacked Metasurface Reflectarray." – presented at the July 2020 IEEE Antennas and Propagation Society Annual Meeting in Montreal, Canada.

**Jordan Budhu,** Nicole Pfiester, Kwong-Kit Choi, Steve Young, Chris Ball, Sanjay Krishna, and Anthony Grbic, " Dielectric Resonator Antenna Coupled Infrared Antimonide Photodetectors." – presented at the July 2020 IEEE Antennas and Propagation Society Annual Meeting in Montreal, Canada.

Alireza. Kazemi, **Jordan Budhu**, et. al., "Subwavelength antimonide infrared detector coupled with dielectric resonator antenna," Proceedings Volume 11002, Infrared Technology and Applications XLV; 1100221 (2019).

Nicole. A. Pfiester, **Jordan Budhu**, et al., "Modeling and extraction of optical characteristics of InAs/GaSb strained layer superlattice," Proc. SPIE 11407, Infrared Technology and Applications XLVI, p. 114070M, 2020.

Nicole. A. Pfiester, **Jordan Budhu**, et al., "Optical properties of III-V superlattices for the design optimization of antenna-coupled detectors," presented at the SPIE Defense and Commercial Sensing 2020 Digital Forum online, Anaheim, CA, March, 2020.

**Jordan Budhu** and Anthony Grbic, "A Reflective Metasurface for Perfect Cylindrical to Planar Wavefront Transformation," 14th International Congress on Artificial Materials for Novel Wave Phenomena – Metamaterials 2020, New York, USA, Sept. 28th – Oct. 3rd, 2020.

**Jordan Budhu** and Anthony Grbic, "Passive Reflective Metasurfaces for Far Field Beamforming" – presented at the March 2021 European Conference on Antennas and Propagation (EuCAP) Annual Meeting in Dusseldorf, Germany.

## INVITED TALKS

**Jordan Budhu** and Yahya Rahmat-Samii, "Directivity Enhancement of Offset Fed Reflectarray Antennas." –presented at the Electrical Engineering Department Annual Research Review, University of California, Los Angeles, March 2012

**Jordan Budhu** and Yahya Rahmat-Samii, "Next Generation Spaceborne Wind Scatterometer Weather Radar Satellite Antenna." –presented at the March 2018 National Science Foundation (NSF) California Academic Alliance Retreat in Berkeley, California.

**Jordan Budhu** and Yahya Rahmat-Samii, "Next Generation Spaceborne Wind Scatterometer and CubeSat Antennas: Lightweight 3D Printed Inhomogeneous Lens Antennas and Dual Reflectarray Antennas." –presented at the University of Michigan Radiation Laboratory Seminar, Ann Arbor, June 2018.

**Jordan Budhu** and Yahya Rahmat-Samii, "Next Generation Spaceborne Wind Scatterometer and CubeSat Antennas: Lightweight 3D Printed Inhomogeneous Lens Antennas and Dual Reflectarray Antennas." –presented at the University of Michigan Radiation Laboratory Seminar for the IEEE Remote Sensing Chapter, Ann Arbor, April 2019.