Niraj K. Inamdar, Ph.D.

Education

Massachusetts Institute of Technology, *Department of Earth, Atmospheric and Planetary Sciences*
Ph.D., Planetary Science 2016
GPA: 5.0/5.0. Dissertation: *The Formation and Evolution of Planetary Systems*

Massachusetts Institute of Technology, *Department of Mechanical Engineering*
S.M., Mechanical Engineering 2011
GPA: 5.0/5.0. Thesis: *Analysis and Implementation of the Bilayer Microfluidic Geometry*

University of Pennsylvania, *School of Engineering and Applied Science*
B.S.E. *Magna Cum Laude*, Mechanical Engineering & Applied Mechanics 2008
Senior Design Projects: *Reconnaissance Robot*; *Envirodyne Filtration Tank Cleaning System*

Professional Experience: Summary

- Chief System Architect and Associate Director, Raytheon Intelligence & Space — June 2021 - present
- Senior Principal Systems Engineer, Raytheon Intelligence & Space — June 2019 - June 2021
- Adjunct Faculty, Santa Monica College — August 2017 - July 2020
- Associate Physical Scientist, RAND Corporation — May 2018 - June 2019
- Senior Member of Technical Staff, The Aerospace Corporation — April 2017 - April 2018
- Graduate Research and Teaching Assistant (Doctoral), MIT — August 2011 - September 2016
- Graduate Research Assistant (Master's), MIT — September 2009 - July 2011
- Mechanical Engineer, Raytheon Space and Airborne Systems — July 2008 - September 2009
- Mechanical and Structural Engineering Intern, Boeing Integrated Defense Systems — May 2007 - August 2007
- Manufacturing Engineering Intern, Boeing Integrated Defense Systems — May 2006 - August 2006

Professional Experience: Details

Raytheon Intelligence & Space
El Segundo, California

Chief System Architect and Associate Director, Systems Engineering Center June 2021 - present
Senior Principal Systems Engineer, Raytheon Intelligence & Space June 2019 - June 2021

I concurrently support a broad portfolio of programs—ranging from production programs to IRAD—at all system abstraction levels, from architecture-level to detailed design. Some highlights include:

- Algorithm Development and Modeling Lead, Signal Chain. Led development and design of novel algorithms and wrote implementations for self-consistent onboard adaptive spatiotemporal data packet allocation and target identification; onboard image transformation, interpolation, and resampling; and ground data packet management on go-fast Next Gen Overhead Persistent Infrared (OPIR) Geo program through successful PDR and successful CDR, with designs used on multiple other programs. Constructed high-fidelity image generation and physical effects models (with novel combinatorial impact analysis) and carried out new characterization of focal plane array data. Led 16-engineer team through further design, development, and performance analysis activities (including firmware, software, and engineering unit verification and test) and development of mission performance assessment environment. Technical Lead, R3 resiliency effort.
- Created novel concepts and algorithms for high-throughput automated PIC layout and developed new optical phased array voltage mapping, calibration, and steering techniques. Constructed end-to-end system performance models for photonic integrated circuit (PIC)-based optical communication networks (Kyber) and the same for Everlong. LSE, Lasercom Subsystem (Everlong).
- Lead Architect and Systems Engineer, Alma. Primary Investigator, Rushmore Tech I. Performance CPT Lead, Verona portfolio (currently lead 14 senior engineers across the US). Chief System Architect, STACK (Space-time Adaptive Cryptography and Kinematics), a novel integrated PNT+cryptography authentication protocol. Analysis Lead, Track Custody Demonstration. Chief Analyst and Mission Architect, SDA Tranche 1 Tracking Layer.

Associate Physical Scientist, RAND Corporation
Santa Monica, California May 2018 - June 2019

Led or otherwise made significant contributions to a number of projects for US Government customers, including:

- Methodology for defining resilient space enterprise in support of Joint Force. Lead. Developed high-fidelity numerical models for missile dynamics and detection by air- and spacecraft, analytical models for scenarios such as rad-hardened constellation design, and methodology for carrying out sensitivity analysis. Sponsor: US Air Force (USAF).

- Modeling operational energy requirements and distribution. Lead. Developed genetic algorithm-based codeset to calculate operational energy transport scheduling and allocation for maritime domain and corresponding sea/land interfaces at strategic and operational levels for wargaming. Sponsor: Office of the Secretary of Defense (OSD).
- Mosaic warfare. Created novel mathematical and computational models for assessment/valuation of Mosaic warfare systems (DARPA).
- PLEO constellations. Lead. Created end-to-end constellation lifetime fielding and replenishment simulation for proliferated LEO constellations to determine launch, management, and reconstitution requirements (OSD).
- Fast acquisition for TRMC. Lead. Identified driving and nascent capabilities and technologies for space, quantum computing, and air autonomy test and evaluation, assessed current infrastructure, and recommended actions for new ones. Developed taxonomy for space threats, offensive and defensive space capabilities, corresponding concepts and physical models (OSD).
- Space Mission Force readiness. Lead. Created interactive visualization tool to track operational task and readiness relationships for the Air Force, with primary application towards Space Mission Forces (USAF).

Other FY19 projects included defining and assessing universal C2 languages (OSD) and space launch location investment prioritization (USAF).

Senior Member of Technical Staff, The Aerospace Corporation

El Segundo, California April 2017 - April 2018

- Principal Investigator, Forward Engineering (May 2017 - April 2018). Led initiative through corporation's iLab to develop techniques to forward engineer innovative concepts for the Corporation and its customers. Project included novel need-space and solution-space generation exercises integrated with concurrent engineering/concept design methodologies, with demonstration through case studies such as lasercom and planetary defense.
- Lead, Project Rogue Flash (January 2018 - March 2018). Lead of six-person team which generated concepts for rapid missile defense and warning capability reconstitution. Team member, Project Thor Blue/Black Swan Futures Foresighting workshop (March 2018).
- Created flexible network analysis toolset (with Monte Carlo capabilities) for utility, reliability, resiliency, and link budget systems characterization. Developed models for optical communication networks, including novel acquisition probability and optimization calculations.
- Mission Analysis Engineer, Surface Water & Ocean Topography (SWOT; April 2017 - April 2018). Performed earned value management for NASA mission. Developed software utilities in Python and Excel to significantly decrease analysis time (from 8+ hours to a few seconds) and increase analysis fidelity through IMS/EVM tool interface.
- High-level responsibilities included participating in broad range of architecture-level design activities (with emphasis on development and evaluation of innovative and cost-effective space systems architectures, concepts, and performance) and supporting end-to-end modeling
- Other activities included: Developing a variety of utilities in Python and VBA to improve architecture-level mission analysis and Enterprise information exchange (May 2017 - April 2018); mentoring graduate and undergraduate interns on planetary defense study through Concept Design Center (June 2017 - September 2017); and supporting Hosted Payload Office through interface requirements definition and document generation (May 2017).

Code Project Developer, TESS

Cambridge, Massachusetts October 2016 - March 2017

- Contractor for Transiting Exoplanet Survey Satellite (TESS), NASA's next generation exoplanet discovery mission
- Developed architecture description, module interface standards, and best practices for TESS simulated image generator (TSIG) system performance model, which will generate simulated data used to constrain TESS's engineering and scientific error budgets
- Worked with students and TESS staff to interface new astrophysics and noise models into TSIG's Python framework

Research Assistant, Massachusetts Institute of Technology

Cambridge, Massachusetts September 2011 - September 2016

- Constructed the first self-consistent planet formation models accounting for core-nucleated gas accretion, thermal evolution, and dynamical interactions via giant impacts in order to constrain formation pathways for super-Earths and mini-Neptunes. Wrote novel code (including shock hydrodynamics and thermal evolution models) and interpolation routines. Several manuscripts in varying stages of preparation in addition to those already published, as well as work reconstructing the natural remanent magnetism of asteroid 433 Eros using SPICE kernels and observational constraints (April 2014-September 2016).*

* Passed doctoral qualifying exams in Mechanical Engineering Department in May 2012. Switched to Earth, Atmospheric and Planetary Sciences Department in February 2014 and passed doctoral qualifying exams there in November 2014.

- Science and Optics Lead for REXIS, an X-ray imaging spectrometer which will examine surface composition of asteroid 101955 Bennu for NASA's OSIRIS-REx mission. Constructed instrument system performance model, modeling Solar X-ray and asteroid fluorescence spectra, as well as instrument response (including radiation damage) and data interpretation in order to determine whether REXIS can place Bennu within an analogue meteorite class and infer its formation history (September 2012-June 2014). Led team based at MIT and Harvard-Smithsonian CfA. Carried out instrument cover deployment dynamics and shielding analysis, coded aperture mask and frame design, and engineering model thermal test (September 2011-June 2014).
- Constructed new quaternion dynamics models, leapfrog integrator, and control laws in MATLAB and Simulink for NIAC-funded project investigating use of high-temperature superconductors for electromagnetic formation flight and structures deployment (August 2011-October 2012)
- Modeled dynamics and control of small satellite optical communication systems for startup Planetary Resources, Inc. (PRI) from inception of the company and under NAIC funding. Built testbed with telescopes and demonstrated tip-tilt mirror laser control (February 2012-February 2013).

Research Assistant, MIT & Charles Stark Draper Laboratory
Cambridge, Massachusetts October 2009 - August 2011

- Conducted research in microfluidics towards development of new devices for *in vitro* biomedical applications (advisors: Dr. Jeffrey Borenstein of Draper Labs and Prof. Linda Griffith of MIT)
- Developed the first analytical model characterizing solute transport and consumption in bilayer geometry and extended Sturm-Liouville theory of PDEs into multiple adjacent domains
- Designed, built, and populated bilayer microfluidic devices with hTERT mesenchymal stem cells. Research supported under Award Number R01EB010246 from the National Institute of Biomedical Imaging and Bioengineering.

Mechanical Engineer, Raytheon Space and Airborne Systems
El Segundo, California July 2008 - September 2009

- Design and drafting of assemblies for next generation radar and processing systems, Global Hawk and ASARS
- Sustaining mechanical engineer, AESA; sustaining mechanical engineer, P1196; and mechanical engineering lead, Transmit Drive integrated microwave assembly, MIRA. Mechanical design in Pro/E and circuit board layout in AutoCAD and Pantheon. Significant collaboration with electrical engineers and vendors throughout the design process.

Research Assistant, University of Pennsylvania School of Engineering and Applied Science
Philadelphia, Pennsylvania September 2007 - May 2008

- Optimized fabrication of carbon nanopipettes using vapor deposition towards creating more graphitic (and less amorphous) probes ($\phi \approx 0.4$ μm; advisors: Prof. Haim Bau and Dr. Michael Schrlau)
- Investigated methods of creating metallic pipettes/biological nanoprobes from Au and Ag

Intern, Boeing Integrated Defense Systems, Satellite Development Center
El Segundo, California

Mechanical and Structural Engineer May 2007 - August 2007

- Supported a number of actions as liaison between Mechanical & Structural Engineering and Manufacturing Engineering, including reviewing processes, validating Engineering drawings, and developing build plans and statements of work for programs such as MSV and Protostar

Manufacturing Engineer May 2006 - August 2006

- Created virtual, interactive simulations of satellite integration processes in Advanced Technologies group in the Manufacturing Engineering homeroom

Teaching

Adjunct Faculty, Santa Monica College Department of Physical Sciences
Santa Monica, California August 2017 - July 2020

- Instructor for Engineering 11, *Engineering Graphics and Design*, during the fall terms of 2017 and 2018 and spring terms of 2019 and 2020. Designed the course to introduce students to the design life cycle (including need space generation, concept design, engineering design, and manufacturing) using wholly original course material and a guided term design project.
  - Also taught solid modeling/CAD, engineering drawing creation, and geometric dimensioning & tolerancing.
- Instructor for Engineering 16, *Dynamics*, during the spring terms of 2018 and 2019. Topics covered include kinematics of particles, systems of particles, rigid body dynamics, and mechanical vibrations and stability. Created all original lecture material and coding/modeling-based term project. Original textbook written.

Teaching Assistant, MIT Department of Earth, Atmospheric and Planetary Sciences
Cambridge, Massachusetts February 2015 - May 2015
February 2014 - May 2014

- Teaching assistant and grader for course 8.290/12.425/12.625, *Extrasolar Planets: Physics and Detection Techniques*, with Prof. Hilke Schlichting during the spring term of 2015, and Profs. Hilke Schlichting and Sara Seager during the spring term of 2014
- Wrote significant amount of original course material, including physics notes and code for data analysis and planetary interior structure integration

Teaching Assistant, MIT Department of Earth, Atmospheric and Planetary Sciences
Cambridge, Massachusetts September 2014 - December 2014

- Teaching assistant and grader for course 12.098/12.S680, *Formation and Evolution of Planetary Systems*, with Prof. Hilke Schlichting during the fall term of 2014

Visiting Instructor, Space Mission and System Design Program, Politecnico di Torino
Turin, Italy Spring 2014

- One of three visiting instructors from MIT for a course in the Space Mission and System Design program for M.Sc. students at Politecnico di Torino (24 March-30 March and 28 May-15 June)
- Program focused on developing science and engineering requirements for a CubeSat mission to Mars, with my focus on applications to the Martian atmosphere and future habitability

Teaching Assistant, MIT Department of Earth, Atmospheric and Planetary Sciences
Cambridge, Massachusetts September 2013 - December 2013

- Teaching assistant and grader for course 12.815/12.816, *Atmospheric Radiation*, with Prof. Sara Seager during the fall term of 2013
- Wrote significant amount of course material for students, including notes, 2D and 3D Monte Carlo scattering code, and code for correlated-k distribution radiative transfer

Teaching Assistant, MIT Department of Aeronautics and Astronautics
Cambridge, Massachusetts September 2011 - December 2011

- Teaching assistant for course 16.83, *Space Systems Engineering*, with Prof. Sara Seager and others during the fall term of 2011

Teaching Assistant, University of Pennsylvania School of Engineering and Applied Science
Philadelphia, Pennsylvania September 2007 - December 2007
September 2006 - December 2006

- Teaching assistant and grader for MEAM 245, *Introduction to Flight*, with Dr. Bruce Kothmann during the fall term of 2007 and Prof. Ira M. Cohen during the fall term of 2006

Other Academic Employment

Graduate Resident Tutor, East Campus Dormitory, Massachusetts Institute of Technology
Cambridge, Massachusetts October 2014 - June 2016

- Live-in mentor for the Fifth East hall in MIT's East Campus dormitory

Laboratory Manager, Weiss Tech House, University of Pennsylvania
Philadelphia, Pennsylvania September 2005 - May 2008

- Managed open student laboratory for the University, including logistics, lab set-up, drafting laboratory regulations, and lab instruction for both engineering and non-engineering students
- Held seminars and one-on-one sessions in design mentoring. Office hours held several hours per week focusing on mentoring, tutoring, CAD, and lab help.

Publications and Presentations

Journal Articles

- **N.K. Inamdar** and H.E. Schlichting. "Stealing the Gas: Giant Impacts and the Large Diversity in Exoplanet Densities". *Astrophysical Journal Letters*, **817** (2016).
- **N.K. Inamdar** and H.E. Schlichting. "The Formation of Super-Earths and Mini-Neptunes with Giant Impacts". *Monthly Notices of the Royal Astronomical Society*, **448** (2015).
- **N.K. Inamdar** and J.T. Borenstein. "Microfluidic cell culture models for tissue engineering". *Current Opinion in Biotechnology*, **22** (2011).

- **N.K. Inamdar**, L.G. Griffith, J.T. Borenstein. "Transport and shear in a microfluidic membrane bilayer device for cell culture". *Biomicrofluidics*, **5** (2011).
- D. Byun, Y. Lee, S.B.Q. Tran, V.D. Nugyen, S. Kim, B. Park, S. Lee, **N. Inamdar**, and H.H. Bau. "Electrospray on super-hydrophobic PTFE surface nozzle treated by Ar and O_2 ion beam". *Applied Physics Letters*, **92** (2008).

Refereed Conference Proceedings

- **N.K. Inamdar**, R.P. Binzel, J. Hong, B. Allen, J. Grindlay, R.A. Masterson. "Modeling the Expected Performance of the REgolith X-ray Imaging Spectrometer (REXIS)". In: Proceedings of SPIE; 2014 August 18; San Diego, CA.
- D.B. Carte , **N.K. Inamdar**, M.P. Jones, R.A. Masterson. "Design and Test of a Deployable Radiation Cover for the REgolith X-ray Imaging Spectrometer (REXIS)". In: Proceedings of the 42nd Aerospace Mechanisms Symposium; 2014 May 14-16; Baltimore, MD.
- B. Allen, J. Grindlay, J. Hong, R.P. Binzel, R. Masterson, **N.K. Inamdar**, M. Chodas, M.W. Smith, M.W. Bautz, S.E. Kissel, J. Villasenor, M. Oprescu, N. Induni. "The REgolith X-Ray Imaging Spectrometer (REXIS) for OSIRIS-REx: Identifying Regional Elemental Enrichment on Asteroids". In: Proceedings of SPIE; 2013 September 5; San Diego, CA.
- **N. Inamdar**, L.G. Griffith, J. Borenstein. "Transport Model for Microfluidic Device for Cell Culture and Tissue Development". *Mater. Res. Soc. Symp. Proc.*, **1299** (2010).

Refereed Abstracts

- J. Hong, B. Allen, J.E. Grindlay, R.P. Binzel, R. Masterson, **N.K. Inamdar**, M. Chodas, M.W. Smith, M.W. Bautz, S.E. Kissel, J.N. Villasenor, A. Oprescu. "REgolith X-Ray Imaging Spectrometer (REXIS) Aboard NASA's OSIRIS-REx Mission". In: American Astronomical Society Meeting Abstracts #224; 2014 June 1-5; Boston, MA.
- F. Nichele, S. Corpino, S. Seager, M. Knapp, **N. Inamdar**, V. Stamenkovic. "Three Scenarios for Valuable Planetary Science Missions on Mars: Next Generation of Cubesats to Support Space Exploration". In: Proceedings of the 65th International Astronautical Congress; 2014 September 29-October 3; Toronto, Canada.
- H.L. Bralower, **N.K. Inamdar**, S.E. Falcone, R.A. Masterson. "Design and Test of a Deployable Radiation Cover for the REgolith X-ray Imaging Spectrometer (REXIS)". In: Proceedings of the 42nd Aerospace Mechanisms Symposium; 2014 May 14-16; Baltimore, MD.
- E.A. Vitol, M.G. Schrlau, **N. Inamdar**, H.H. Bau. "Raman spectroscopy analysis of synthesis effects on carbon nanopipette properties". In: Proceedings of the 236th National Meeting of the American Chemical Society; 2008 August 17-21; Philadelphia, PA. Division of Analytic Chemistry ANYL 398.

Book Chapters and Other Publications

- **Niraj K. Inamdar**. "Small Satellite Optical Communication Networks: Analytical Models." arXiv: 1807.10393 (2018).
- **Niraj K. Inamdar** and 8 others. "Enhancing Decision Support for Assessing Space Mission Assurance: Technical Companion." RAND PR-3591/1-AF (2018; refereed).
- **Niraj K. Inamdar** and 8 others. "(U) Enhancing Decision Support for Assessing Space Mission Assurance: Policy Report." RAND PR-3591-AF (2018; refereed).
- **Niraj K. Inamdar** and 5 others. "Operational Energy Decision Aide: A Tool for Estimating Energy Use to Support Planning and Wargaming Activities." RAND PR-3927-DHS (2018; refereed).
- **Niraj K. Inamdar** and 14 others. "Technology Investment Priorities to Improve First Response Capabilities." RAND PR-3874-DHS (2018; refereed).
- Sivan Ginzburg, **Niraj K. Inamdar**, Hilke E. Schlichting."Super-Earths: Atmospheric Accretion, Thermal Evolution and Envelope Loss". Book chapter for *Formation, Evolution, and Dynamics of Young Solar Systems*. Springer (2017).
- **Niraj K. Inamdar**. "The (Non-)Magnetization of 433 Eros: Possible Mechanisms for the Lack of Magnetism as Measured by NEAR." arXiv: 1807.10393 (2013).
- **N.K. Inamdar**, L.G. Griffith, J.T. Borenstein. "Transport Models for 3-Dimensional Cell Culture Systems". Book chapter for *Microfluidic Cell Culture Systems*. Elsevier (2013).
- G.V. Gettliffe and **N.K. Inamdar**. "High-Temperature Superconductors as Electromagnetic Deployment and Support Structures in Spacecraft". NASA NIAC Phase I Final Report (2012).

Some Talks, Poster Sessions, and Technical Reviews

- "Building a Team (and a Payload) for the Next Generation". Nominated by Vice President of Space & C2 to give Raytheon Intelligence & Space-wide leadership "RED Talk". 2021 September 21; El Segundo, CA.

- "Space Optical Communication Networks". Held an invited half-day Raytheon-wide workshop on architecting space systems with a particular focus on optical communication networks. All-original presentation material supplemented with tool created for attendees, with modules on constellation design, atmospheric effects, and uplink and downlink budgets. 2020 November 2; online.
- "The Theoretical Minimum: Building a Common Analytical Toolset Across STEM Fields". Held two invited workshops at Santa Monica College focusing on overarching mathematical themes across STEM fields. First focused on linear algebra, built up the theory of representations, and highlighted applications across various disciplines of tools like orthogonal basis expansions and Rayleigh quotients. Second workshop focused on differential equations and focused on practical techniques such as nondimensionalization, order of magnitude analysis, and numerical implementation; 2019 November 27 and December 6; Santa Monica, CA.
- "The Diversity of Observed Exoplanetary Systems: Pathways to Exoplanet Formation". Invited talk for AIAA Exoplanets: In Search of Habitable Worlds Mini-Conference; 2019 August 21; Manhattan Beach, CA.
- "Visitors from Our Solar and Galactic Neighborhood: 'Oumuamua and the Possibility of Visits by Rocks from Exoplanetary Systems". Invited talk for AIAA Planetary Defense & Asteroid Exploration Mini-Conference; 2019 June 29; Rolling Hills Estates, CA.
- "The Story of Our Solar System as Told By Asteroids". Invited talk for AIAA Planetary Defense & Asteroid Exploration Mini-Conference; 2018 June 30; Redondo Beach, CA.
- "Satellites, Telescopes, and Space Probes: Journeying into the Solar System (and Beyond)". Invited guest lecture for EPS SCI 9, *Solar System and Planets*, at UCLA; 2018 March 15; Los Angeles, CA.
- "Pathways to Exoplanet Formation: Insight into the Diversity of Observed Exoplanetary Systems". Aerospace Corporation Astronomy Club Talk; 2017 May 4; El Segundo, CA.
- "The Formation and Evolution of Planetary Systems". Public thesis defense; 2016 August 2; Cambridge, MA.
- "Stealing the Gas: Giant Impacts and the Large Diversity in Exoplanet Densities". Sant Cugat Forum on Exoplanets; 2016 April 21; Sant Cugat del Vallès, Spain.
- "Pathways to Exoplanet Formation: Insight into the Diversity of Observed Exoplanetary Systems". Brown University Planetary Geosciences Lunch Colloquium; 2016 April 14; Providence, RI.
- "Pathways to Exoplanet Formation: Insight into the Diversity of Observed Exoplanetary Systems". MIT Planetary Science Colloquium Series; 2015 December 8; Cambridge, MA.
- "The Formation of Super-Earths and Mini-Neptunes with Giant Impacts". Poster session at 2015 Sagan Summer Workshop; 2015 July 27-31; Pasadena, CA.
- Invited speaker for MIT Department of Earth, Atmospheric, and Planetary Sciences Department Patron's Circle fundraising event; 2015 April 8; Cambridge, MA.
- "The Formation of Super-Earths and Mini-Neptunes with Giant Impacts". Physics of Exoplanets: From Earth-sized to Mini-Neptunes, Kavli Institute for Theoretical Physics; 2015 February 23-27; Santa Barbara, CA.
- "The Formation of Super-Earths and Mini-Neptunes with Giant Impacts". MIT Planetary Science Colloquium Series; 2014 November 12; Cambridge, MA.
- "Modeling the Expected Performance of the REgolith X-ray Imaging Spectrometer (REXIS)". Presented at the SPIE Optics + Photonics Conference; 2014 August 18; San Diego, CA.
- "Telescope System" and "Systems Performance Modeling". REXIS Critical Design Review; 2014 February 18-19; Cambridge, MA.[†]
- "Elements of Spectroscopy". MIT Space Systems Laboratory Seminar; 2013 May 17; Cambridge, MA.
- "REXIS". Presented at the Second Annual Gathering of New England Planetary Scientists; 2013 April 27; Boston, MA.
- "Imaging System" and "Systems Performance Modeling". REXIS Preliminary Design Review; 2013 January 31-February 1; Cambridge, MA.[†]
- "Science Overview". REXIS Systems Requirements Review; 2012 January 23; Cambridge, MA.[†]
- "Transport Characteristics of Bilayer Device for Cell Culture and Tissue Development". Poster session at the Annual Meeting of the Biomedical Engineering Society; 2011 October 13; Hartford, CT.
- "Transport Model for Microfluidic Device for Cell Culture and Tissue Development". Poster session at the Materials Research Society Fall Meeting; 2010 November 30; Boston, MA.

Working Papers and Technical Notes

- Available upon request

[†] Presented to NASA and external reviewers

Additional Details

- **Computing:** MATLAB, Simulink, AutoCAD, Pro/E, SolidWorks, Inventor, CATIA, UN*X, VBA, LaTeX, Python, R, experience with C++, IDL, and DELMIA
- **Languages:** English, Italian, Latin, Gujarati, varying levels of familiarity with several other languages
- **Art:** Extensive portfolio of engineering/architectural design, figure drawing, and other artwork
- **Writing:** Details available upon request
- **Mentoring:** One undergraduate from the MIT EAPS Department on her Bachelor's thesis (2012), one undergraduate researcher (UROP) from the MIT AeroAstro and EAPS Departments for his work on REXIS (2013), one EAPS UROP for his work on the transit signatures of planets with ring systems (2014), and a number of others (graduate and undergraduate) on a less formal basis at both MIT and Penn. I have also mentored a senior undergraduate from Memorial University (Canada; 2013-2014); two graduate interns at Aerospace Corporation (2017); an International Baccalaureate student on mathematically modeling tire evolution, race strategy, and scheduling in Formula 1 (2021); and a number of junior engineers at Raytheon (2019-present).
- **Outreach and Other Activities:** An Astronomical Event (MIT, 9 October 2012); AAAS Annual Meeting Family Days (Boston, 16 February 2013); EAPS Patron's Circle (MIT, 8 April 2015 and 7 April 2016); Boston: Sink or Swim (Boston Athenæum, 21 September 2015); and other MIT departmental, graduate student, and UROP outreach events (2013-2016). Co-organizer of MIT's Planetary Science Colloquium Series (September 2015-August 2016). Reviewer for *Astronomical Journal*, *Astrophysical Journal*, and *Monthly Notices of the Royal Astronomical Society* (2016-present).
- **Media:** Interviewed for work on exoplanets, work on REXIS, and work at MIT in general.[‡] Exoplanet work covered in "astrobites" astrophysics blog.[§]

Selected Awards, Honors, and Fellowships

- Invention Award, Raytheon Technologies, December 2021
- Patent Award, Raytheon Technologies, February 2021
- 2020 Innovators Award (2×), Raytheon I&S, November 2020
- Invention Award, Raytheon Technologies (2×), July and December 2020
- Achievement Award, Raytheon Intelligence & Space, May 2020
- Finalist, Raytheon Innovation Challenge, January 2020
- Asteroid 134180 Nirajinamdar named for me, August 2016
- Robert R. Shrock Fellowship, June 2015 - June 2016
- Grant recipient, de Florez Fund for Humor, MIT, December 2015
- On the Spot Award, MIT Division of Student Life, April 2015
- Grayce B. Kerr Fellowship, September 2014 - May 2015
- Award for Excellence in Teaching, MIT Department of Earth, Atmospheric and Planetary Sciences, May 2014
- Membership, Sigma Xi, May 2011 (Declined)
- Research Fellowship, Charles Stark Draper Laboratory, October 2009-August 2011
- Achievement Award, Raytheon SAS, June 2009
- Lester B. Knight Fellowship, March 2009 (Declined)
- Spotlight on Performance Award, RF Surveillance Group, Raytheon SAS, January 2009
- Vittorini Prize, Finalist for Italian Composition, May 2008
- Engineering Excellence Award, Boeing Integrated Defense Systems, August 2006

[‡] https://www.youtube.com/watch?v=--MeKE_OUNU and https://www.youtube.com/watch?v=Y2UiRam0uaI
[§] http://astrobites.org/2014/12/31/how-a-super-earth-gets-its-atmosphere-or-at-least-where-it-doesnt/