

# JON PIERRE FORTNEY

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## EDUCATION

- 2002 – 2008:** Arizona State University Tempe, AZ  
Ph.D. Mathematics
- 1991 – 1996:** University of Pennsylvania Philadelphia, PA  
Bachelor of Arts: Mathematics and Actuarial Sciences
- 1991 – 1996:** University of Pennsylvania Philadelphia, PA  
Bachelor of Science in Engineering: Chemical Engineering

## CERTIFICATIONS

- 2009:** Teaching English as a Second/Foreign Language (TESL/TEFL) Washington, DC  
Certification from Oxford Seminars

## ACADEMIC AND TEACHING EXPERIENCE

- 2024 – Pres: Assistant Teaching Professor**, University of Maryland Baltimore County Baltimore, MD
- Undergraduate Program Committee, Hiring Committee
- 2022 – 2024: Mathematics Instructor**, University of Arizona Tucson, AZ
- Selected to teach a special topics class (Math 496T) in Spring 2024 called Differential Forms and Calculus on Manifolds, based on my first book.
  - Volunteered to teach Elements of Calculus (Math 113), a large-lecture format class (approx. 130 students)
  - Collegiate Service: Transferred Elements of Calculus class notes (approx. 160 pages) from Word to  $\text{\LaTeX}$  to make future maintenance and changes easier; volunteered at math booth during book fair
- 2022:** **Visiting Assistant Professor**, University of the Virgin Islands U.S.V.I.
- Visiting assistant professor in Spring 2022
  - Taught introduction to number theory, business calculus, vector calculus, and differential equations
  - Volunteered to be on Mathematics Curriculum Review Committee
- 2012 – 2021: Assistant Professor**, Zayed University Dubai, United Arab Emirates
- Served as course coordinator for discrete mathematics for computer science (Mth 215) 2017-2020. In this capacity prepared approximately 2000 questions for over 200 question pools on Blackboard in response to university mandated move to online assessment, which became indispensable during Covid-19
  - Prepared course videos and other content for distance learning in response to Covid-19 crisis
  - Wrote undergraduate textbook for discrete mathematics in computer science course (Mth 215) taught at Zayed University; published by CRC Press in 2020
  - Developed course syllabi, lesson plans, supplemental class notes, and practice worksheets, prepared and graded tests, quizzes, and projects for all classes
  - Aided Zayed University College of Education in preparation of accreditation paperwork outlining how mathematics courses meet National Council of Teachers of Mathematics (NCTM) standards
  - Involved with Zayed University mobile learning initiative in which iPads are utilized in the classroom, aided in developing iPad-based teaching modules

- University Service: Member of various department and college committees, which are listed below. But of particular interest, was member of Department of Mathematics and Statistics Curriculum Redesign Committee for Col 111, developed course objective and determined course content, designed assessment tools and lesson plans, and piloted the new course
- 2009 – 2010: English Language Instructor**, Vinnell Arabia Riyadh, Saudi Arabia
- Taught lessons on grammar, reading comprehension, listening, and pronunciation using Defense Language Institute (DLI) material to Saudi Arabian National Guard (SANG) officers and Non-Commissioned Officers (NCOs)
- 2007 – 2008: Fulbright Fellow**, University of Groningen Groningen, Netherlands
- Conducted research in geometric mechanics and circuit dynamics
  - Reported and presented results to Fulbright Committee and peers; conducted seminar talk for fellow graduate students
- 2002 – 2007: Mathematics Instructor**, Arizona State University Tempe, AZ
- Developed course syllabi, lesson plans, and educational materials such as supplemental class notes and practice worksheets
  - Prepared and graded tests, quizzes, projects, and classroom activities
  - Initiated and managed classroom activities to develop student skills
- 2000 – 2001: Tutor**, Sylvan Learning Center/Quest Learning Center Long Beach, CA
- Aided students in understanding mathematical concepts and procedures, helped students improve reading comprehension and writing skills, tutored students in science and social studies topics, and taught summer enrichment classes

## PROFESIONAL AND INDUSTRY EXPERIENCE

- 2010 – 2012: Quality Assurance Specialist**, Vinnell Arabia Riyadh, Saudi Arabia
- Vinnell Arabia, a joint venture with Northrop Grumman, provides educational and training services to Saudi Arabia National Guard (SANG) personnel
  - Performed and coordinated a range of monthly, quarterly, semi-annual, and annual audits on all aspects of business and training operations; ensured designated auditors were qualified and briefed
  - Maintained register of deficiencies and non-compliance along with corrections required and completed; coordinated recommendations with affected directors, division managers, and other program employees
  - Reviewed quality assurance standards, studied existing policies and procedures, and analyzed program operations to ensure continuous process improvement
  - Prepared monthly Quality Assurance Plan Report for senior management and Quality Metrics for corporate office
- 2009: Consultant**, short term contract by Barrons Associates, Inc. Elkridge, MD
- Investigated generalized Polynomial Chaos Expansion techniques utilized in solving stochastic differential equations
  - Investigated image registration and matching techniques utilized in medical imaging and computational anatomy
- 2001 – 2002: Consultant**, Advanced Environmental Controls Newport Beach, CA
- Obtained working-level familiarity with environmental air quality control regulations of the South Coast Air Quality Management District (SCAQMD)
  - Aided on-site audits of client facilities in the textile and automotive parts manufacturing industries, to determine air quality regulatory compliance
  - Prepared client permit applications for construction, modification, replacement, and relocation of equipment which impacted air quality
  - Reported client NOx emissions to SCAQMD in compliance with the Regional Clean Air Incentives Market (RECLAIM) program

**1996 – 1998: Actuarial Analyst**, Tillinghast - Towers Perrin

Philadelphia, PA

- Analyzed expected losses for self-insured medical groups and hospitals utilizing a combination of statistical techniques and historical data
- Estimated financial holdings to ensure client's compliance with risk management regulations
- Aided in preparation of reports for both clients and regulatory agencies

## BOOKS

J.P. Fortney, *A Visual Introduction to Differential Forms and Calculus on Manifolds*, Birkhäuser, 2018 (<https://www.springer.com/us/book/9783319969916>, 37 Citations: [Google Scholar](#))

This book explains and helps readers to develop geometric intuition as it relates to differential forms. It includes over 250 figures to aid understanding and enable readers to visualize the concepts being discussed. The basic ideas and concepts are gradually built up so that definitions, when made, do not appear out of nowhere, and both the importance and role that theorems play is evident as or before they are presented. With a clear writing style and easy-to-understand motivations for each topic, this book is primarily aimed at second- or third-year undergraduate math and physics students with a basic knowledge of vector calculus and linear algebra.

J.P. Fortney, *Discrete Math for Computer Science: An Example-Based Introduction*, CRC Press, 2020 (<https://doi.org/10.1201/9781003091479>)

This book is intended for a first- or second-year discrete mathematics course for computer science majors. It covers many important mathematical topics essential for future computer science majors, such as algorithms, number representations, logic, set theory, Boolean algebra, functions, combinatorics, algorithmic complexity, graphs, and trees.

J.P. Fortney and Linda Smail, *Applied Business Calculus: A Practical and Example-Based Introduction* (Accepted for publication by CRC Press. Expected completion: Summer 2024)

This book is intended for first-year university students specializing in business and economics. It will cover all the essential calculus related topics necessary for undergraduate business or economics students in a concise and comprehensive manner. It also includes a practical exploration of business calculus, reinforcing theoretical knowledge through a wide range of real-world business and economics applications.

## PUBLICATIONS

J.P. Fortney, "Basis Independence of Implicitly Defined Hamiltonian Circuit Dynamics," in T. Abualrub et al. (eds.) *Mathematics Across Contemporary Science*, Springer Proceedings in Mathematics and Statistics 190, pp. 77-90, Springer International, 2017 ([https://link.springer.com/chapter/10.1007/978-3-319-46310-0\\_5](https://link.springer.com/chapter/10.1007/978-3-319-46310-0_5))

J.P. Fortney, "Dirac Structures in Pseudo-Gradient Systems with an Emphasis on Electrical Networks," *IEEE Transactions of Circuits and Systems – I: Regular Papers*, Vol. 57, No. 8, Aug. 2010. (<https://ieeexplore.ieee.org/document/5371870>, 5 Citations: [Google Scholar](#))

D.J. Parrillo, J.P. Fortney, R.J. Gorte, "A Comparison of Adsorption and Reaction Properties in Cu-ZSM-5 and Cu-Y," *Journal of Catalysis*, Vol. 153, No. 1, Apr. 1995 (<https://www.sciencedirect.com/science/article/pii/S0021951785711207>, 19 Citations: [Google Scholar](#))

## TALKS AND PRESENTATIONS

**2022:** UVI Mathematics Seminar: "A Gentle Introduction to Differential Forms." St. Croix, USVI

**2019:** Workshop at Zayed University: "Plan your book. Write your book. Perfect your book." Dubai, UAE

**2017:** Seminar Talk: "A Visual Introduction to Differential forms and the Wedge Product" Dubai, UAE

- 2016:** Joint Mathematical Meetings (American Mathematical Society and Mathematical Association of America) – Refereed Talk “*Language in the Statistics Classroom: When the Problem Isn’t Just the Math*” Seattle, USA
- 2015:** American University Sharjah 2nd International Conference of Mathematics and Statistics (Joint conference with American Mathematical Society), Refereed Talk “*Basis Independence of Implicitly Defined Hamiltonian Circuit Dynamics*” Sharjah, UAE
- 2014:** Seminar Talk: “*The Banach-Tarski Paradox*” Dubai, UAE
- 2013:** 8th International Young Researchers Workshop on Geometry, Mechanics, and Control, Refereed Talk “*Geometric Relationship Between Implicitly Defined Hamiltonian Systems and Pseudo-Gradient Systems*” Barcelona, Spain
- 2013:** Park City Mathematics Institute (PCMI) Summer School in Geometric Analysis, Seminar Talk “*An introduction to Dirac Structures in Geometric Mechanics*” Park City, USA
- 2013:** UAE Math Day, Refereed Talk “*Modeling Hamiltonian Circuit Dynamics using Dirac Structures*” Al-Ain, UAE

## AWARDS AND GRANTS

- 2016 – 2017:** Department support to attend Scholarship of Teaching and Learning training at the Center for Educational Innovation, Zayed University
- 2016:** Zayed University Professional Development Grant to attend the Joint Mathematical Meetings (American Mathematical Society and Mathematical Association of America)
- 2015:** Zayed University Professional Development Grant to attend 2015 National Conference of Teachers of Mathematics
- 2015:** Zayed University Professional Development Grant to attend American University Sharjah 2nd International Conference of Math and Statistics
- 2013:** Zayed University Professional Development Grant to attend 8th International Young Researchers Workshop on Geometry, Mechanics, Control
- 2013:** National Science Foundation (NSF) full funding to attend Park City Mathematics Institute (PCMI) Summer School in Geometric Analysis
- 2013 – 2014:** Zayed University Research Start-Up Grant
- 2007 – 2008:** Fulbright Fellowship to spend one year at University of Groningen in the Netherlands
- 2005:** Arizona State University Outstanding Teaching Assistant Award
- 2002 – 2007:** Arizona State University Teaching Assistant Fellowship

## COURSES TAUGHT

- Finite Mathematics (UMBC/Math 215)
- Applied Calculus (UMBC/Math 155)
- Special Topics: Differential Forms and Calculus on Manifolds (UA/Math 496T) [Spring 2024](#)
- Calculus Preparation(UA/Math 120R)
- Business Calculus (UA/Math 116)
- Elements of Calculus (UA/Math 113)
- Modeling with Algebraic and Trigonometric Functions (UA/Math 108)
- Differential Equations (UVI/Mat 346)
- Intermediate Calculus II (UVI/Mat 342)
- Calculus for Business and Social Sciences (UVI/Mat 232)
- Number Theory (UVI/Mat 215)
- Modern Geometry (ZU/Mth 361)
- Elementary Geometry (ZU/Mth 261)
- Statistics (ZU/Mth 281)
- Discrete Math (ZU/Mth 215)
- Business Statistics (ZU/Mth 213)
- Business Calculus (ZU/Mth 113)
- Modeling with Functions (ZU/Gen 111)
- Modeling with Data (ZU/Gen 110)
- Basic Mathematics (ZU/Mth 101)
- Calculus III (ASU/Mat 272)
- Calculus II (ASU/Mat 271)
- Calculus I (ASU/Mat 270)
- Elementary Lin. Algebra (ASU/Mat 242)
- Brief Calculus (ASU/Mat 210)
- Precalculus (ASU/Mat 170)
- Finite Math (ASU/Mat 119)
- College Algebra (ASU/Mat 117)

## UNIVERSITY SERVICE AND COMMITTEE WORK

- 2024 – Pres:** Department of Mathematics & Statistics: Undergraduate Program Committee
- 2024 – 2025:** Department of Mathematics & Statistics: Hiring Committee (Assistant Teaching Professor)
- 2022:** K-12 Mathematics Curriculum Review Committee for the Virgin Islands
- 2020 – 2021:** Planning Committee for Math Minor at Zayed University
- 2019 – 2020:** Local Planning Committee for UAE Math Day
- 2019:** Reviewer: 4th Annual World Conf. of the Int’l Assoc. of Blended Learning
- 2018 – 2021:** Faculty volunteer for the Math Café, Zayed University’s math tutor center
- 2017 – 2020:** Course Coordinator for Discrete Math for Computer Science (Mth 215)
- 2017 – 2019:** College of Natural and Health Sciences Committee on Online Content
- 2017 – 2018:** Department of Mathematics & Statistics: Hiring Committee
- 2015 – 2017:** University College: College Research Committee
- 2015 – 2016:** Department of Mathematics & Statistics: Hiring Committee
- 2014 – 2015:** Department of Mathematics & Statistics: Curriculum Redesign Committee
- 2013 – 2015:** University College: Professional Development Committee
- 2013 – 2014:** Organized and ran department seminar
- 2013 – 2014:** Department of Mathematics & Statistics: Hiring Committee
- 2013 – 2014:** Department of Mathematics & Statistics: Curriculum Redesign Committee

## ADDITIONAL PROFESSIONAL SERVICE AND OUTREACH

- Participated in Science Olympiad held at UMBC 2025
- Proctored for Putnam Exam 2025
- Participated in outreach events sponsored by the Department of Mathematics & Statistics’ Enrollment Growth Outreach Committee 2024-2025
- New faculty mentor at University of Arizona 2023-2024
- Transferred University of Arizona Elements of Calculus (Math 113) course notes (approx 160 pages) from Word to  $\text{\LaTeX}$  to make future maintenance and changes easier 2023-2024
- Tutor at UA Think Tank 2022-2023
- Gave talk at UA undergraduate math club 2023
- Volunteered at math department booth during the University of Arizona book fair 2023
- Produce the UAE Math Day booklet using  $\text{\LaTeX}$  2020
- Faculty volunteer for Mathematics Tutor Center 2012-2019
- Involved in planning and presenting annual “Pi Day” activities, which provided a variety of enjoyable and educational mathematics related activities for students 2012 - 2019
- Organized and ran Department of Mathematics and Statistics seminar 2013-2014
- Gave talks in both department seminars and for university wide events
- Acted as a reviewer for the Zayed University Undergraduate Research Journal (published internally)
- Volunteered to teach evening classes to aid colleagues with young children who could not teach evening classes
- Due to being one of the only native English speakers in department at Zayed University, frequently reviewed and edited written material for colleagues