

# PRANAV MOHAN

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## EXECUTIVE SUMMARY

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My passion is in finding opportunities to help others and going an extra step for them, whether it is through the roots of engineering, research or through education and this is why I want to be a professor.

## EDUCATION

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| <b>BS</b> | The University of Oklahoma, <b>Mechanical Engineering</b><br>Minor – Mathematics, LGBTQ Ally<br>Honors – Summa Cum Laude (Highest Honors category) | August 2015 – May 2019 |
| <b>MS</b> | Purdue University, <b>Mechanical Engineering</b><br>Advisor: Professor Sadegh Dabiri<br>Thesis: Numerical Simulation of Cavitation Bubble Dynamics | August 2019 – Present  |

## HONORS AND AWARDS

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|-------|---|------|---|
| HA15. | <b>Second Prize:</b> Video Contest in Ecological Sciences and Engineering Symposium 2019    | HA7. | <b>Winner and Travel Grant 2017</b> – National Science Foundation (NSF) Design Essay Competition Winner |
| HA14. | <b>Best Capstone Award</b> in Aerospace and Mechanical Engineering for Prototyping Category | HA6. | <b>Honors Research Assistant Program (HRAP) Scholar</b> – AY 2017 and AY 2018                           |
| HA13. | <b>Honors College Award</b> for Distinction in Undergraduate Research 2019                  | HA5. | <b>Outstanding Sophomore</b> in Mechanical Engineering – AY 2016  |
| HA12. | <b>Donna Shirley Engineering Award</b> , 2019   | HA4. | <b>Rita H. Lottinville Outstanding Freshman</b> AY 2015   |
| HA11. | <b>John E Fagan</b> Creativity and Innovation Award 2018-19                                 | HA3. | <b>Honors Poster Fair and Distinguished Research Award</b> – Spring' 17                                 |
| HA10. | <b>Letzeiser Award</b> – AY 18-19 highest academic award on campus                          | HA2. | <b>Honors Engineering Research Experience (HERE) Scholar</b> – Spring' 16                               |
| HA9.  | <b>Big Man on Campus</b> – AY 17-18 for outstanding contribution to the campus              | HA1. | <b>Mercury Robotics 7<sup>th</sup> place</b> at Oklahoma State University Robotics Competition          |
| HA8.  | <b>Undergraduate Research Opportunity Program</b> – Grant \$800 for Spring 2019             |      |   |

## JOURNAL PUBLICATIONS

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- J4. **Mohan, P.**, Dabiri, S., "Numerical simulation of cavitation bubble dynamics in line vortices." *in prep.*, (2021)
- J3. **Mohan, P.**, Surianarayan, N., Rajendran, L., Dabiri, S., Vlachos, P., "Study of single bubble rise in a linear stratified flow in a confined channel using background oriented schlieren and particle image velocimetry." *in prep.*, (2021)
- J2. Belardo, C. R., **Mohan, P.**, "Menstrual cups for women empowerment: a research study in Northern India." *in prep.*, (2021)
- J1. Nellippallil, A. B., **Mohan, P.**, Allen, J. K., and Mistree, F., 2020. "An Inverse, Decision-Based Design Method for Robust Concept Exploration." *ASME. J. Mech. Des.* August 2020; 142(8): 081703. [Link](#). **Citations:** 10

## CONFERENCE PUBLICATIONS

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- C4. **Mohan, P.**, Dabiri, S., "Cavitation bubble dynamics in a line Rankine vortex." 11<sup>th</sup> Symposium on Cavitation (CAV2021), 2021: Abstract submitted
- C3. **Mohan, P.**, Dabiri, S., 2020, "Numerical Simulation of Cavitation Bubble Dynamics in a Rankine Vortex." *Bulletin of the American Physical Society – Division of Fluid Mechanics*, Chicago, IL, USA. [Link](#), [Video](#)

- C2 Nellippallil, A.B., **Mohan, P.**, Allen, J.K., and Mistree, F., 2019, "*Inverse Thermo-Mechanical Processing (ITMP) Design of a Steel Rod During Hot Rolling Process*," ASME Design Automation Conference, Anaheim, CA, USA. Paper Number: DETC2019-97930. [Link](#). Citations: 11
- C1 Nellippallil, A.B., **Mohan, P.**, Allen, J.K., and Mistree, F., 2018, "*Robust Concept Exploration of Materials, Products and Associated Manufacturing Processes*," ASME Design Automation Conference, Quebec City, Canada. Paper Number: DETC2018-85913. [Link](#). Citations: 20

## ENTREPRENEURSHIP

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### Menstrual Mates LLC, Co-Founder

May 2019 – August 2020

- Manufacturing of a new design of a menstrual cup
- Focusing on publication of a period book for pre-menarche children
- Managing one intern

## GRANTS

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- G6. Assisted in: Hydraulic Trainer Augmentation for Distance Learning – **USD\$89,987**, August 2020 – August 2021, Funded by Maha Foudation – Dr. Sadegh Dabiri
- Building a three degrees of freedom linear stage
  - Design and built of a robotic arm
  - Software implementation and connecting the trainer to be cloud controlled
- G5. Davis Foundation and University of Oklahoma, Project for Peace Menstrual Hygiene Management (MHM), **USD\$ 10,000**, January 2018 – August 2019 (Co-PI: Cindy Belardo & Abhishek Yadav)
- Reaching Lucknow, Kanpur, Sitapur, Agra, Gurugram and the state of Maharashtra
  - Training state level trainers to talk about MHM with a focus on menstrual cups
  - Leading discussions on best practices of the use of cloths, sanitary napkins, tampons and menstrual cups
  - Identifying and making connections with various organization to host discussions at their centers
- G4. Tom Love Innovation Hub, Creating a Self-Adjusting Menstrual Cup – Sooner Launch Pad – **USD\$10,000** May 2019 – August 2019 (Co-PI: Cindy Belardo)
- Convertible Note
  - Creating a business plan for the company
  - Conducting an Institution Review Board study to evaluate the use
  - Setting up a manufacturing plant for mass production
  - Filing a patent to capture the innovative design
- G3. Tom Love Innovation Hub, Sooner Innovation Fund – Redesigning the Menstrual Cup, **USD\$5,000**, January 2019 – May 2019 (Co-PI: Cindy Belardo)
- Creating a new design of menstrual cup with inter-linked chain
  - Conducting a market research to evaluate the success of the redesigning menstrual cup
- G2. OU Honors College, Design Methodology for Moving Failure Analysis to the Early Stages of Design, **USD\$800**, Advisors: Professors Andres Cavieres, November 2018 – May 2018
- Proposing a broad methodology that assists in bringing failure analysis at the early stages of design
  - Developing a jig system to test the solar clip that keeps solar panels in place
  - Proposing a better and more robust design based on the failure system results
- G1. National Science Foundation and American Society of Mechanical engineering – Travel Grant – **USD\$1,250** Visiting International Design Engineering Technical Conference to present my research in a poster, August, 2017
- Identifying research challenges of manufacturing companies by 2030
  - Integrating Inverse Goal-Oriented Decision Based Design Method with Sustainable Manufacturing
  - Proposing an alternative example of hot rod rolling which matches sustainability index

## POSTERS AND PRESENTATIONS

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- P10. **Mohan, P.**, Belardo, C., 7<sup>th</sup> February 2020, “Menstrual Cups for Women Empowerment: A research study in Northern India,” ABE Graduate Research Symposium, West Lafayette, Indiana, USA
- P9. Belardo, C., **Mohan, P.**, Yadav, A., Allen, J. K., 1<sup>st</sup> November 2019, “Menstrual Cups for Women Empowerment: A research study in Northern India,” Women’s Health Symposium, West Lafayette, Indiana, USA
- P8. **TEDxOU** – Belardo, C. R., **Mohan P.**, “Menstrual Cup for Women Empowerment,” University of Oklahoma, Norman, USA, 13<sup>th</sup> September 2019 - [Link](#)
- P7. **Undergraduate Research Day 2019** – Belardo, C. R., **Mohan, P.**, Allen, J. K., Mistree, F., “Menstrual Cups for Women’s Empowerment,” University of Oklahoma, Norman, USA, 6<sup>th</sup> April 2019
- P6. **Undergraduate Research Day 2019** – **Mohan, P.**, Mandal, S., Nellippallil, A. B., Cavieres, A., “Moving Failure Analysis to Early Stages of Design with FMEA and Additive Manufacturing,” University of Oklahoma, Norman, USA, 6<sup>th</sup> April 2019
- P5. **Undergraduate Research Day 2018** – **Mohan, P.**, Nellippallil, A.B., Allen, J.K., Mistree, F., “Microstructural Modelling of Hot Rod Rolling using Inverse Goal-Oriented Decision Based Design Method,” University of Oklahoma, Norman, USA, 7<sup>th</sup> April 2018
- P4. **Symposium Presentation** – **Mohan, P.**, Nellippallil, A.B., Allen, J.K., Mistree, F., “Microstructural Modelling of Hot Rod Rolling using Inverse Goal-Oriented Decision Based Design Method,” American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers (AIAA & ASME Symposium), 14<sup>th</sup> April, 2018
- P3. **Mohan, P.**, Nellippallil, A.B., Allen, J.K., Mistree, F., 5<sup>th</sup> March 2018, “A Goal-Oriented, Inverse Decision Based Design Method to Achieve the Vertical and Horizontal Integration of Models”, Student Research and Creativity Day, National Weather Center, University of Oklahoma, Norman, USA
- P2. **Mohan, P.**, Nellippallil, A.B., Allen, J.K., Mistree, F., 12<sup>th</sup> August 2017, “Staying Competitive with IGODBD and Sustainable Manufacturing”, IDETC 2017, Cleveland, Ohio, USA
- P1. **Mohan, P.**, Nellippallil, A.B., Allen, J.K., Mistree, F., 8<sup>th</sup> April 2017, “A Goal-Oriented, Inverse Decision Based Design Exploration of a Multistage Hot Rod Rolling System”, Undergraduate Research Day 2017, Honors College, University of Oklahoma, Norman USA

## ARTICLES ABOUT ME

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- A15. “OU students, doctor go above and beyond to create tools for boy born with muscle disorder,” Schamback, Jessica, KOCO News, May 21<sup>st</sup>, 2019, [Article](#), [Video](#)
- A14. “Student receives funding to work with GCA Professor on Solar Research,” Christopher C. Gibbs College of Architecture, December 3<sup>rd</sup>, 2018 - [Article](#)
- A13. “G.E.P Make Alumni Connections And Learn A Lot!,” Tang, Lydia, Wilson, Melanie, Alumni portfolio of United World College of South East Asia, November 14<sup>th</sup>, 2018, [Article](#)
- A12. “Community Engagement Stories of OU Students,” Pendley, Joy, September 25<sup>th</sup>, 2018 – [Article](#)
- A11. “OU students chosen for peace grant to educate women in India on menstrual health,” Morales, Rebeka, August 27<sup>th</sup>, 2018 - [Article](#)
- A10. “The intellectual crossroads of information advocacy,” Julian, Chelsea, OU Libraries, August 6<sup>th</sup>, 2018 – [Article](#)
- A9. “Oklahoma University Students Led by Pranav Mohan Educating Women in India,” India-West Global News, August 3<sup>rd</sup>, 2018 – [Article](#)
- A8. “OU students chosen for peace grant to educate women in India on menstrual health,” Scafe, Evelyn, OU Daily, July 24<sup>th</sup>, 2018 – [Article](#)
- A7. OU AME Newsletter 2018, Page 27-28, Gallogly College of Engineering – [Article](#)
- A6. Davis Foundation, “Why wait to make a difference?,” Yearly Report 2018-19, Page 47 – [Article](#)
- A5. OU AME Graduate Student Community Blog post 557524174629852, April 10<sup>th</sup>, 2018 – [Article](#)

- A4. "University of Oklahoma Campus Awards – Big Man," OU Daily Newspaper, April 7<sup>th</sup>, 2018 – [Article](#)
- A3. "Pranav Mohan is Placed on 2018 Letzeiser Honor List," Morales, Rebekah, School of Aerospace and Mechanical Engineering Blog, March 23<sup>rd</sup>, 2018 – [Article](#)
- A2. "Undergraduate Student, Pranav Mohan, Wins Prestigious Awards," Morales, Rebeka, School of Aerospace and Mechanical Engineering Blog, March 23<sup>rd</sup>, 2018 – [Article](#)
- A1. "Foundation welcomes newest Lottinville Prize winners", Harpe, Anne B., Fall 2016 – [Article](#)

## RESEARCH EXPERIENCES

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**Dabiri Research Group**, Purdue University, West Lafayette, USA August 2019 – Present

### Graduate Research Assistant

**Advisor:** Professor Sadegh Dabiri (dabiri@purdue.edu)

- Numerical simulation of cavitation bubble dynamics in different vortices using computation fluid dynamics
- Evaluating mixing efficiency due to the rise of bubbles in confined stratified flows using experimental techniques such as Background Oriented Schlieren, Particle Image Velocimetry and optical flow
- Design and build of a remotely controlled hydraulic trainer for online classes

**Systems Realization Laboratory**, University of Oklahoma, Norman

October 2016 – May 2019

### Student Research Assistant

**Advisor:** Professors Janet K. Allen and Farrokh Mistree (janet.allen@ou.edu and farrokh.mistree@ou.edu)

**Mentor:** PhD Candidate – Anand Balu Nellippallil (anand.balu@ou.edu)

- Finding the satisficing grain growth parameters in the hot rod rolling process chain problem for the environment provided by Tata Consultancy Services (TCS) – India.
- Simulating the problem on compromise Decision Support Problem (cDSP) and Decision Support in the Design of Engineering Systems (DSIDES)
- Robust design (Type I, II and III) for cooling stages of hot rod rolling

**Impact of sustainable menstrual practices in Uttar Pradesh, India**

January 2018 - Present

- Creating a big enough sample user base to evaluate
- Creating research methodologies in terms of monthly surveys to evaluate various parameters, such as, comfortability, sustainability, lifestyle changes, etc.
- Finding ways to quantify qualitative parameters mentioned above
- Statistical analysis of surveys from over 200 women

**Materials Department, Indian Institute of Technology, Kanpur**

May 2017 – August 2018

### Student Research Associate

**Advisor:** Professor Amarendra Kumar Singh (amarendra@iitk.ac.in)

- Developed model for the recrystallization and grain growth for Hot Rod Rolling process
- Coded in MATLAB to create working functions that represent the initial variable to a final grain size.

## TEACHING EXPERIENCES

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**Teaching Assistant**, School of Mechanical Engineering, Purdue University

- Spring 2019: ME263 – Mechanical Engineering Design, Innovation and Entrepreneurship
- Fall 2020: ME309 – Fluid Mechanics
- Select Student Comments:
  - "Pranav is very friendly and helpful. He is willing to help with anything related to the lab material at any time needed. Explaining the grading and the reasons behind it is very helpful."
  - "Communication with students regarding supporting information for deliverable assignments and ensuring each checkpoint is met so students can maximize points."

- “Pranav does a great job making himself available for questions as well as providing advice on assignments. I hope he continues to make himself available for questions as well as provide advice to the different groups about their designs when in class.”

**Dean’s Leadership Council – Student Mentor (TA),** College of Engineering August 2018 – May 2019

**Advisors:** Professors Randa Shehad (rlshehab@ou.edu) and Kimberly G. Wolfenbarger (kimw@ou.edu)

- Leading a group of Freshmen engineering students for their first semester to hone their engineering skills, such as: Programming - Arduino and C++, Soldering, Circuitry, Robot building and Project Management

**Undergraduate Academic Assistant,** Math Center at the Department of Mathematics August 2018 – May 2019

**Supervisor:** Professor Christine Tinsley (cjoy@ou.edu)

- Tutoring and teaching myriads of undergraduate courses including Math for critical thinking, Business Calculus and Differential Calculus

**Student,** Electrical Engineering

Spring 2017 to Fall 2017

**Private tutoring** for Physics for Engineers Part 1 and 2 (PHYS 2514 and PHYS 2524)

- Going over fundamental of physics in topics of Newtonian/classical mechanics, electronics and magnetism

#### CLUBS/INVOLVEMENT OFFICER POSITIONS

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- **Ambassador** – Engineering Undergraduate Research Office – Fall 2019 - Present

#### MEMBERSHIPS

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- **American Society of Mechanical Engineers** – Spring 2017 – Present
- **Tau Beta Pi** – Honorary Engineering Society – Fall 2018 – Present
- **American Physics Society** – Fall 2020 - Present

#### SKILLS

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- **Programming Languages** – Java, MATLAB, LabVIEW, R, FORTRAN, Latex, Python
- **Simulation Software** – NI Multisim, Solidworks, FEBio, AutoCAD, ANSYS, ABAQUS, OpenFOAM, BASILISK, EDPIV, Insight
- **Creative Software** – Adobe Photoshop, Final Cut Pro 10X, Blender 3D animation, Microsoft Packages

#### IMPORTANT COURSEWORK

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- **MATH4753** – Applied Statistical Methods: Dr. Wayne Stewart – Grade A
- **AME5213** – Biomechanics I: Dr. Chung Hao Lee – Grade A
- **ME510** – Compressible Flow: Dr. Aaron Morris – Grade A
- **ME608** – Numerical Methods of Heat and Mass Transfer: Dr. Partha Mukherjee – Grade A
- **ME611** – Turbulence: Dr. Jun Chen – Grade TBD
- **ME597** – Particle Image Velocimetry; Dr. Steven T. Wereley – Grade TBD

#### REFERENCES (AVAILABLE ON REQUEST)

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**Steven T. Wereley, PhD**

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**Pavlos Vlachos, PhD**

Professor

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Purdue University

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