

# Dr. Patrick Levi Journey

## Contact

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## Education/Training

<i>Years</i>	<i>Degree / Certificate</i>	<i>Institution</i>
August 2016- August 2019	Postdoctoral Fellow	Oregon Health & Science University
August 2011- August 2015	PhD. Mechanical Engineering	The University of Texas at Austin
August 2009 - August 2011	Master of Science in Engineering	The University of Texas at Austin
August 2005- May 2009	Bachelor of Science in Mechanical Engineering	The University of Portland

## Position Title

<i>Years</i>	<i>Position</i>	<i>Institution</i>
August 2019- Present	Assistant Professor of Biomedical Engineering	San José State University
November 2019- 2021	Clinical Assistant Professor	Oregon Health & Science University

## Research Experience

### **Synthetic Vasculature and Cardiovascular Biomicrofluidics.**

Biomedical Engineering Department, Charles W. Davidson College of Engineering, San José State University.

Role: **Principal Investigator**

**August 2019 – Present**

## **Cardiovascular Devices and Endothelial Cell Regulation for Treatment of Cardiovascular Disease**

Department of Biomedical Engineering, Oregon Health & Science University.

Supervisor: **Dr. Monica Hinds** August 2016 – July 2019

## **Novel Nanoparticles and Bio-Microfluidic Assays for Improved Drug Delivery Efficacy**

Department of Mechanical Engineering, University of Texas at Austin.

Supervisor: **Dr. Li Shi** August 2009 – August 2015

## **Total Artificial Heart Characterization and Development**

Knight Cardiovascular Institute, Oregon Health & Science University.

Collaborator: **Dr. George Giraud** November 2017 – June 2020

## **Vascularization of 3D Tissue Constructs**

Department of Biomedical Engineering, Oregon Health & Science University.

Collaborator: **Dr. Luiz Bertassoni** September 2018 – January 2020

## **Passive Tremor Reduction in an Eating Utensil for Parkinson's Disease Patients**

Department of Mechanical Engineering, The University of Portland.

Supervisor: **Dr. Timothy Doughty** August 2008 – 2009

- Co-Founded **Neptune Biomechanics LLC** in June 2009.

## **Microfluidics applications for single-molecule DNA tethering and unzipping using optical tweezers**

Department of Physics, The University of New Mexico.

Supervisor: **Dr. Steven Koch** June 2008 – August 2008

## **Teaching Experience**

### **1. BME 207 – Experimental Methods in Biomedical Engineering – Fall 2022**

Graduate-level course in experimental methods. Major topics include design of experiments, advanced statistics, and data analysis. ~25 graduate students.

### **2. BME 115 – Foundations of Biomedical Engineering – Fall 2019, Spring 2020, Fall 2020, Spring 2021, Spring 2022**

Upper-division/grad course covering introduction to the fundamental principles of biomedical engineering. Core conservation equations are applied to mass, energy, charge, and momentum transfer in biomedical systems. Additional topics provide a breadth of exposure in cell and molecular biology, diagnostics and analytical techniques, statistical analysis of biomedical data, bioinformatics, bioinstrumentation, FDA regulations, and biomedical ethics. ~65 graduate and undergraduate students.

### **3. BME 117 – Biotransport Phenomena – Fall 2020, Fall 2022**

Instructor of record for upper-division/grad course covering applications of fundamentals of thermodynamic and kinetic aspects of momentum and mass transport phenomena to biological systems. Including development of quantitative descriptions of transport processes beginning from the molecular level to entire organ systems. ~25 graduate and undergraduate students.

4. **BME 115L – Foundations of Biomedical Engineering Laboratory – Fall 2019, Spring 2020**  
Responsible for laboratory development, supervision of adjunct instructors, and instructor of record for one section of 16 graduate and junior-level undergraduate biomedical engineering majors. ~65 students. In Summer 2020 I adapted the laboratory course for online instruction, including writing labs which utilizing online learning and simulation platforms.
5. **EGR 491/591-Biomechanics – Spring 2018**  
Developed and taught a senior-level mechanical engineering and graduate level biomedical engineering course in biological applications of transport phenomena at the microscale. Split course time between lecturing on biological transport phenomena and current biomedical research. 12 students.
6. **EGR 110-Introduction to Engineering – Fall 2017**  
Served as an adjunct faculty member and **Instructor of record** for 29 first-year Computer Science, Mechanical, Civil, and Electrical Engineering students. The course was structured around a design competition for which I provided primary instruction to interdisciplinary teams on the design process, circuits, software, structures, and machines.

<b>Advising Experience (See also: <a href="https://www.jurneylab.org/">https://www.jurneylab.org/</a>)</b>
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1. **Research advisor for eleven undergraduate and eight graduate students. – AY 22-23**
  - a. **Mentee Competitive Research Awards:**
    - i. **CSUPERB Faculty-Graduate Student Research Collaboration Award**
    - ii. **Walter C. Benzing Fellowship**
    - iii. **Charles W. Davidson Student Scholarship**
    - iv. **College of Engineering Student Travel Grant**
2. **Research advisor for eight undergraduate and three graduate students. – AY 21-22**
  - a. **Mentee Competitive Research Awards:**
    - i. **McNair Scholar – Fall 2021**
    - ii. **Summer Equity Intern (OHSU) – Summer 2021**
  - b. **BME Departmental Awards**
    - i. **BME Outstanding Teaching Assistant award**
    - ii. **BME Undergraduate Research Award**
    - iii. **BME Promise Award**
3. **Research advisor for fifteen undergraduate and two graduate students. – AY 20-21**
  - a. **Mentee Competitive Research Awards:**
    - i. **McNair Scholar – Fall 2020**
    - ii. **Professional Development Grant – Fall 2020**
4. **Research advisor for eleven undergraduate and one graduate student. – AY 19-20**
  - a. **Mentee Competitive Research Awards:**
    - i. **Undergraduate Research Grant (2X) – Fall 2019**
    - ii. **Davidson Research Scholar (2X) – Fall 2019**
    - iii. **Professional Development Grant – Fall 2019**

5. Undergraduate Student Mentor, American Heart Association Undergraduate Fellow, Oregon Health & Science University, Summer 2018, 2019
6. Undergraduate Student Mentor, MJ Murdock Charitable Trust, Oregon Health & Science University, Summer 2017
7. Undergraduate Student Mentor, BUILD EXITO, Oregon Health & Science University, 2017
8. Biotech Advisor (BME 550-Biomedical Engineering & Society Capstone), University of Portland, Spring 2017

## Professional Societies

### Membership

- Biomedical Engineering Society (2010-present)
- American Heart Association (2017-present)
- International Society on Thrombosis and Haemostasis (2018-present)

## Service

### Professional

- AHA Fellowship Review Committee: Bioengineering 1 (2021, 2022 spring & fall)
- NSF Reviewer (2022, 2023)
- California State University Program for Education & Research in Biotechnology (CSUPERB) Review Committee (2022, 2023)
- Review Editor responsible for safeguarding the peer-review system, controlling the quality of articles published, and proposing/managing special issue topics for:
  - *Frontiers in Materials* (2021-present)
  - *Frontiers in Bioengineering and Biotechnology* (2021-present)
  - *Frontiers in Molecular Biosciences* (2021-present)
- Manuscripts Reviewed for:
  - *Soft Matter*
  - *Journal of Controlled Release*
  - *ACS Biomaterials Science & Engineering*
  - *Frontiers in Bioengineering*
- Abstract Reviewer: Biomedical Engineering Society annual meeting (2017-present)
- Submission Review Committee: Summer Biomechanics, Bioengineering, and Biotransport Conference (2020-present)

### University, College, and Department

- Charles W. Davidson College of Engineering Research Committee (2022-present)
- Undergraduate Curriculum Committee Member, Davidson College of Engineering (2020-2022)
- Biomedical Engineering Designated Faculty Advisor (2021-2022)

- Faculty Hiring Committee Member, Biomedical Engineering Department (Fall 2020)

#### K-12

- Invited talk: “*The Nanoworld and You*” Albuquerque Academy. Albuquerque, NM (2017)

#### Community

- Lead mechanical engineer and Spanish translator for Engineers Without Borders, University of Portland chapter.
  - Agua Negra, Guatemala (2009)
  - Guadalupe Carney, Honduras (2009)
- *Graduates Linked with Undergraduates in Engineering* mentor for sophomore Chemical Engineering student (2010-2011)
- Colombian Food Bank Foundation, Vice President of International Relations (2015-present)
- Fundación Barquitos de Papel, Ambassador in Tolú, Colombia (2015)

### **Funding and Major Awards**

1. National Institutes of Health (NIGMS) SCORE Program SC2GM140991, *Reactive Ion Plasma Treatment of Cardiovascular Biomaterials to Understand the Effect of Nanotopography on Endothelialization*  
Role: PI  
Period: 09/01/2021 – 07/31/2024  
Amount: \$425,788
2. California State University Program for Education & Research in Biotechnology (CSUPERB) Early Investigator Award, *Identifying the Molecular Mechanisms of Endothelialization of Next-Generation Vascular Grafts*  
Role: PI  
Period: 05/03/2021 – 11/30/2022  
Amount: \$15,000
3. W.M. Keck Foundation, *Integrating Paper microfluidics in the Undergraduate Curriculum*  
Role: Co-PI (sub-award)  
Period: 01/04/2021 – 09/01/2022  
Amount: \$50,000
4. California State University Program for Education & Research in Biotechnology (CSUPERB) Faculty-Graduate Student Research Collaboration Program, *Establishing a Platform to Elucidate the Adhesome of Endothelial Cell Attachment, Proliferation, and Migration*  
Role: PI  
Period: 06/30/2022 – 05/31/2023  
Amount: \$10,000

### **Achievements, and Appointments**

- Clinical Assistant Professor, Oregon Health & Science University (2019-2021t)
- Adjunct Faculty Member, The University of Portland (2017-2018)

- NIH T-32 Postdoctoral Fellow (2016-2018)
- David Bruton, Jr. Graduate School Fellowship (2013-2014)
- NSF Graduate Research Fellowship Honorable Mention (2010)
- Graduate Presidential Scholar (2010)
- The Outstanding Mechanical Engineering Student (Donald P. Shiley School of Engineering, 2009)
- Karel and Marta Tietze Endowed Scholar (2005-2009)
- University of Portland Men's Soccer Cumulative GPA Award (2006-2008)
- NCAA All-West Region Academic All American (2007 and 2008)
- University of Portland Dean's List (5X)
- West Coast Conference Commissioner's Honor Roll (4X)
- Presidential Scholarship (2005-2009)
- AP Scholar with Distinction (2005)

### Languages

- English (Native Speaker)
- Spanish (Fluent)

### Publications and Patents

(<https://scholar.google.com/citations?user=yZFa0zoAAAAJ&hl=en&oi=ao>)

1. **Journey, P.\***, Parthiban, S. P.\*, Athirasala, A., Franca, C., Tahayeri, A., Menezes, P., Bertassoni, L., '3D Bioprinting of Blood Vessels and Vascular Networks: Progress and Challenges Toward Biofabrication of Functional Vascularized Tissues and Organs', *Emerging Technologies for Biofabrication and Biomanufacturing*. World Scientific Publishing. doi: 10.1142/9789811226090\_0008 (2023)
2. Lakshmanan, HHS., Estonilo, A., Reitsma, S., Melrose, A., Subramanian J., Zheng, T., Maddala, J., Tucker, E., Gailani, D., McCarty, O., Puy, C., **Journey, P.** Revised model of the tissue factor pathway of thrombin generation: role of the feedback activation of FXI. *Journal of Thrombosis and Haemostasis*. <https://doi.org/10.1111/jth.15716> (2022)
3. **Journey, P.**, Glynn, J., Dykan, I., Hagen, M., Kaul, S., Wampler, R., Hinds, M., Giraud, G., Characterization of a Second Generation Pulsatile Rotary Total Artificial Heart *Artificial Organs* 2020.doi:10.1111/aor.13810 (2021)
4. Lakshmanan, H. H. S., Pore, A., Kohs, T., Yazar, F., Thompson, R., **Journey, P.**, Maddala, J., Olson, S., Shatzel, J., Vanapalli, S., and McCarty, O. Design of a Microfluidic Bleeding Chip to Evaluate Antithrombotic Agents for Use in COVID-19 Patients. *Cell. Mol. Bioeng.* 1–9, (2020)
5. Bates, N., Puy, C., **Journey, P.**, McCarty, O. J. T., Hinds M. T., Evaluation of the Effect of Crosslinking Method of Poly(Vinyl Alcohol) Hydrogels on Thrombogenicity. *Cardiovasc. Eng. Technol.* 11:448–455, (2020)
6. **Journey, P.**, Anderson, D., Pohan, G., Yim, E., Hinds, M., Reactive ion plasma modification of poly(vinyl-alcohol) increases primary endothelial cell affinity and reduces thrombogenicity *Macromolecular Bioscience* 18(9) (2018)

7. **Journey, P.**, Agarwal, R., Singh, V., Roy, K., Sreenivasan, S.V., Shi, L., Unique Size and Shape-Dependent Uptake Behaviors of Non-Spherical Nanoparticles by Endothelial Cells due to a Shearing Flow *Journal of Controlled Release* 245, 170–176 (2017).
8. **Journey, P.**, Agarwal, R., Roy, K., Sreenivasan, S.V., Shi, L., Size-Dependent Nanoparticle Uptake by Endothelial Cells in a Capillary Flow System *Journal of Nanotechnology in Engineering and Medicine* 6(1) 011007 (2015)
9. Agarwal, R., **Journey, P.**, Raythatha, M., Singh, V., Sreenivasan, S.V., Shi, L., Roy, K., Effect of Shape, Size and Aspect Ratio on Nanoparticle Penetration and Distribution Inside Solid Tissues using 3D Spheroid Models. *Advanced Healthcare Materials* 4(15) 2269-2280 (2015)
10. Singh, V., Agarwal, R., Marshall K., **Journey, P.**, Roy K., Shi, L., Sreenivasan, S.V., Scalable Fabrication of Low Elastic Modulus Polymeric Nanocarriers with Controlled Shapes for Diagnostics and Drug Delivery. *Journal of Micro and Nano-Manufacturing* 3(1) 011002 (2015)
11. **Journey, P.**, Agarwal, R., Singh, V., Roy, K., Sreenivasan, S.V., Shi, L., Size-Dependent Nanoparticle Margination and Adhesion Propensity in a Microchannel. *Journal of Nanotechnology in Engineering and Medicine* 4(3) 031002 (2013)
12. Agarwal, R., Singh, V., **Journey, P.**, Shi, L., Sreenivasan, S.V., Roy, K., Mammalian Cells Prefer Nanodiscs over Nanorods and Use Shape-specific Uptake Mechanisms. *Proceedings of the National Academy of Sciences* 110 17247-17252 (2013)
13. Agarwal, R., Singh, V., **Journey, P.**, Shi, L., Sreenivasan, S.V., Roy, K., Scalable Imprinting of Shape-Specific Polymeric Nanocarriers Using a Release Layer of Switchable Water Solubility. *ACS Nano* 6 2524-2531 (2012)

### Conference Presentations

1. Leycam, C., Acevedo-Munares, G., **Journey, P.** 3D Holotomographic Imaging of Live Cells to Characterize Endothelialization. Biomedical Engineering Society Annual Meeting.: October 2022; San Antonio, TX. Poster
2. Lakshmanan, HHS., Estonilo, A., Reitsma, S., Melrose, A., Zheng, T., Maddala, J., Gailani, D., **Journey, P.**, Puy, C., McCarty, O. An Integrative Biology Approach to Model the Role of the Feedback Activation of FXI by Thrombin in the Tissue Factor Pathway. International Society of Thrombosis and Haemostasis International Congress July 2022. **Podium**
3. Lakshmanan, HHS., Reitsma, S., Zheng, T., Subramanian, J., Melrose, A., Estonilo, A., Maddala, J., Gailani, D., **Journey, P.**, Puy, C., McCarty, O. Systems Biology of the Tissue Factor Pathway of Thrombin Generation: Role of the Feedback Activation of FXI. 19th U.S. National Congress on Theoretical and Applied Mechanics. June 2022.
4. Faase, R., Bates, N., Plaut, J., Guerra, A., Hinds, M., Baio, J., **Journey, P.** A Platform For Studying The Effects of Nanotopography and Reactive Chemical Species On Integrin Selection. SB<sup>3</sup>C. June 2021. **Podium**
5. Lakshmanan, HHS., Pore, A., Shatzel, JJ., Puy, C., **Journey, P.**, Maddala, J., Vanapalli, SA., McCarty OJT. Development of a Microfluidic Pillar Device to Study Hemostasis in vitro. *Res Pract Thromb Haemost.* 2020; 4 (Suppl 1).
6. Lakshmanan, H., Estonilo, A., Maddala, J., Puy, C., McCarty, O., **Journey, P.** “Predicting and Validating the Role of Coagulation Factor XI in Hemostasis and Thrombin Generation” Oregon Bioengineering Symposium. November 2020; Virtual. Poster

7. Yazar, F., **Journey, P.** “Microfluidic Hemostasis Assay to Study the Mechanisms of Coagulation” Biomedical Engineering Society Annual Meeting.: October 2020; Virtual. Poster
8. **Journey, P.**, “Reactive Ion Plasma Treatment of Poly(Vinyl-Alcohol) (PVA) to Study the Mechanisms of Endothelial Cell Attachment, Migration, Proliferation, and Thrombogenicity” 9th International Bio-Fluid Mechanics And Vascular Mechano-Biology Symposium: February 2020; Tucson, Arizona. **Podium**
9. **Journey, P.**, Yim, E., Hinds, M., “Reactive Ion Plasma Treatment of Poly(Vinyl-Alcohol) (PVA) to Study the Mechanisms of Cell Attachment, Migration, and Proliferation” Biomedical Engineering Society Annual Meeting.: October 2019; Philadelphia, Pennsylvania. Poster
10. **Journey, P.**, Glynn, J., Dykan, I., Hagen, M., Kaul, S., Wampler, R., Hinds, M., Giraud, G., “Characterization of a Pulsatile Rotary Total Artificial Heart” Biomedical Engineering Society Annual Meeting.: October 2019; Philadelphia, Pennsylvania. Poster
11. **Journey, P.**, Anderson, E.J., Pohan, G., Yim, E., Hinds, M., “Has Your Biocompatible Surface Changed? Reactive Ion Plasma Introduces Unstable Functional Groups onto the Surface of Poly(vinyl alcohol)” Biomedical Engineering Society Annual Meeting.: October 2018; Atlanta, Georgia. Poster
12. **Journey, P.**, Anderson, E.J., Pohan, G., Yim, E., Hinds, M., “Reactive Ion Surface Modification of Poly(vinyl alcohol) Affects Endothelial Colony Forming Cell Affinity and Thrombogenicity” International Vascular Biology Meeting.: June 2018; Helsinki, Finland. Poster
13. **Journey P.**, Anderson D., Pohan G., Yim E., Hinds M., “Reactive Ion Plasma Modification of Poly(vinyl alcohol)” Canadian Biomaterials Society Annual Meeting.: May 2018, Victoria, Canada. Poster
14. **Journey P.**, Anderson D., Hagen M., Yim E., Hinds M., “Reactive Ion Surface Modification of Poly(vinyl alcohol) to Enhance Endothelialization and Preserve non-Thrombogenicity” International Society of Thrombosis and Haemostasis International Congress.: July 2017; Berlin, Germany. Poster
15. **Journey, P.**, Anderson, E.J., Hagen, M., Yim, E., Hinds, M., Reactive Ion Surface Modification of Vascular Graft Materials Enhances Endothelialization. North American Vascular Biology Organization.: October 2017; Pacific Grove, CA. Poster
16. **Journey, P.**, Reactive Ion Surface Modification of Vascular Graft Materials to Enhance Endothelialization and Prevent Neointimal Hyperplasia OHSU Knight Cardiovascular Institute Scientific Retreat.: April 2017; Portland, OR. Podium
17. **Journey P.**, Agarwal R., Singh V., Roy K., Sreenivasan S.V., Shi L., “The Effect of Nanoparticle Size on Margination and Adhesion Propensity in Artificial Micro-Capillaries” ASME Micro/Nanoscale Heat and Mass Transfer International Conference 2012, Atlanta, GA. Podium.
18. **Journey P.**, Caldorera-Moore M., Singh V., Agarwal R., Marshal S., Sreenivasan S.V., Roy K., LaBrake D., Shi L., "High Throughput Nanoimprint Manufacturing of Shape-Specific, Stimuli-Responsive Polymeric Nanocarriers for Drug and Imaging Agent Delivery" NSF CMMI Research and Innovation Conference 4-7 January, 2011, Atlanta, GA. Poster
19. **Journey P.**, Singh V., Agarwal R., Marshal S., Caldorera-Moore M., Sreenivasan S.V., Roy K., Shi L., “Nanoimprint Manufacturing of Shape-Specific, Stimuli-Responsive Polymeric Nanocarriers for Drug Delivery in Cancer Therapy” The University of Texas at Austin Graduate recruitment Poster session 4-5 March, 2011 Austin, TX. Poster (**Best poster award**)
20. Hari Hara Sudhan Lakshmanan, Aditya Pore, Rachel Thompson, Jeevan Maddala, **Journey P.**, Joseph Shatzel, Siva Vanapalli, Owen McCarty, “Design and validation of a microfluidic pillar device to study hemostasis under flow”, APS Division of Fluid Dynamics, 2019.



21. Anderson D., **Journey P.**, Cutiongco M., Pohan G., Chevallier P., Mantovani D., Yim E., Hinds M., Reactive ion surface modification of vascular graft materials enhances endothelialization without promoting thrombosis. American Heart Association Basic Cardiovascular Scientific Sessions, Portland, OR. May 2017. Poster
22. Agarwal R., Singh V., Marshall S., **Journey P.**, Shi L., Sreenivasan S.V., Roy K. "Shape Matters: Effect of Polymeric Nanocarriers Shape on Epithelial and Endothelial Cell Lines" Society of Controlled Release July 20-24 2013 Annual Meeting, Honolulu, HI. Poster.
23. Agarwal R., Singh V., **Journey P.**, Shi L., Sreenivasan S.V., Roy K. "Geometry Matters: Cellular Uptake of Nanoscale Drug Carriers is Uniquely Dependent on Particle Size and Shape" Society for Biomaterials Apr 10-13 2013 Annual Meeting, Boston, MA. Podium
24. Agarwal R., Singh V., Marshall S., **Journey P.**, Shi L., Sreenivasan S.V., Roy K. "Shape Matters: A Comparison of Nano-Discoids and Nano-Cylinders for Intracellular Drug Delivery" Biomedical Engineering Society Oct 24-27 2012 Annual Meeting, Atlanta, GA. Poster.
25. Agarwal R., Singh V., Marshall S., **Journey P.**, Shi L., Sreenivasan S.V., Roy K. "In Vitro Characterization of Shape-Specific Nano-Hydrogels" Society For Biomaterials Fall Symposium Oct 4-6 2012 Annual Meeting, New Orleans, LA, Poster.
26. Agarwal R., Moore M.C., Singh V., Marshall S., **Journey P.**, Shi L., Sreenivasan S.V., Roy K. "Nanoimprint Lithography to Study Effect of Shape of Nanocarriers for Drug Delivery." Biomedical Engineering Society 2011 Annual Meeting, Hartford, CT. Podium.
27. Caldorera-Moore M.E., Kang M., Singh V., Moore Z., Agarwal R., **Journey P.**, Huang R., Sreenivasan S., Shi L., Roy K. "Characterization of nanoimprinted shape-specific, disease-responsive drug carriers." Biomedical Engineering Society 2010 Annual Meeting, Austin, TX. Poster.

**References Available Upon Request**