Chayut Teeraratkul
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EDUCATION

University of Colorado Boulder - Boulder, CO
Ph.D. Mechanical Engineering   Aug 2019 - Present
- Advisor: Prof. Debanjan Mukherjee

University of Rochester - Rochester, NY
Master of Science in Mechanical Engineering   Aug 2017 - May 2019
- Thesis: DiNuSphere - A Scalable Pseudospectral Code for Flows in Spherical Geometries
- Advisor: Prof. Hussein Aluie

Bachelor of Science in Mechanical Engineering   Aug 2013 - May 2017
- Cumulative GPA 3.32, Major GPA 3.62
- Graduated with Distinction

RESEARCH EXPERIENCE

Image Derived CFD For Flow Around Dynamic Blood Clots
- Developed a custom image segmentation technique that obtains deforming blood clot geometry inside live mice
- Perform computational fluid dynamics simulation around the image-derived blood clot geometry
- Developed custom preconditioning technique for fictitious domain finite element CFD code of flow around porous blood clots
- Analyze flow and flow-mediated transport around the dynamic blood clots inside live mice

Fluid-Structure Interactions Simulation Of Arterial Blood Clots
- Developed custom mesh non-conforming fluid-structure interaction code which simulates arterial blood clots underflow
- Devised computational methods to study flow and transport around blood clots

Pseudo-Spectral Turbulence Simulation for Spherical Geometry
- Developed a high-fidelity pseudo-spectral turbulence flow simulation on a spherical geometry
- Parallelized the developed code to run on multiple distributed memory processes using MPI

Performance Evaluation of Underwater Turbine Designs
- Conducted CFD simulations via ANSYS Fluent on different underwater turbine shroud geometries.
- Compared the efficiency of each turbine design.

JOURNAL ARTICLES

1. **Teeraratkul, C.**, Tomaiuolo, M., Stalker, T. J., Mukherjee, D. Investigating clot flow interactions by integrating intravital imaging with in silico modeling: flow, transport, and hemodynamic forces. *Under review*

2. **Teeraratkul, C.**, Mukherjee, D. (2021). Microstructure Aware Modeling Of Biochemical Transport In Arterial Blood Clots. *Journal of Biomechanics. 127:110692*

3. **Teeraratkul, C.**, Irwin, Z., Shadden, S.C., Mukherjee, D. (2021). Computational investigation of blood flow and flow-mediated transport in arterial thrombus neighborhood. *Biomechanics and Modeling in Mechanobiology. 20:701-715.*

4. McBride, G., **Teeraratkul, C.** (2017). Lateral Effluent Discharge Apparatus for a Tidal Turbine (Where Does the Water Go?). *Marine Technology Society Journal. 51:86-94(9).*

PEER-REVIEWED PROCEEDINGS

1. **Teeraratkul, C.**, Stalker, T. J., Tomaiuolo, M., Mukherjee, D. Image driven simulation of hemodynamics around a dynamic clot in vivo. *Summer Biomechanics, Bioengineering, and Biotransport Conference. June 2023*

2. **Teeraratkul, C.**, Mukherjee, D. Parallel Implementation of a Hybrid Particle-Continuum Finite Element Framework for Blood Clot Biomechanics. *The International Conference for High Performance Computing, Networking, Storage, and Analysis. November 2020 (held online)*

AWARDS & FELLOWSHIP

1. **Tom and Brenda Geers Graduate Fellowship:** *Awarded for exhibiting extraordinary capabilities and potential for PhD work in solid and/or fluid mechanics.*

2. **Best Poster Award:** *10th Annual Rocky Mountain Advanced Computing Consortium HPC Symposium, 2020*

3. **USNCCM16 Travel Award:** *16th U.S. National Congress on Computational Mechanics, 2021*

4. **APS-DFD Travel award:** *74th Annual Meeting of the American Physical Society Division of Fluid Dynamics, 2021*

PROFESSIONAL EXPERIENCE

Consultant at Qualitrol Corp.   Jun 2016 - Aug 2016
- Performed a CFD simulations via ANSYS Fluent to determine the volume flow rate through the outlet of a pressure relay.
- Used the simulation results to assist in redesigning the pressure relay.

PROFESSIONAL SERVICE

Executive Member USACM Student Chapter   Jan 2023 - present
- Help determine the structure and activities for the student chapter of the U.S. Association of Computational Mechanics.

MENTORING EXPERIENCE

Virtual Summer Research Internship   Jun 2022 - Aug 2022
- Mentor international undergraduate student researcher on the aspects of graduate level research in a US institution.

TEACHING EXPERIENCE

Graduate Part Time Instructor:
- MCEN 5228-005: Computational Fluid Dynamics (Spring 2022)

Teaching Assistant: University of Colorado Boulder
- MCEN 5173: Finite Element Analysis (Spring 2021)

Teaching Assistant: University of Rochester
- ME400: Applied Boundary Value Problems (Fall 2018)
- ME123: Thermodynamics (Spring 2018)
- ME242: Solids and Materials Lab (Fall 2017)
- ME225: Fluid Mechanics (Fall 2016)
- CSC160: Engineering Computing (Spring 2015)

ABSTRACTS & PRESENTATIONS

1. **Teeraratkul, C.**, Tomaiuolo, M., Stalker, T. J., Mukherjee, D. Image Driven Simulation Methodology For In-Vivo Blood Clot-Hemodynamic Interaction *17th U.S. National Congress on Computational Mechanics, Albuquerque, Colorado. July 2023.*

2. **Teeraratkul, C.**, Tomaiuolo, M., Stalker, T. J., Mukherjee, D. Image Driven Simulation of Hemodynamics Around a Dynamic Clot In Vivo *Summer Biomechanics, Bioengineering, and BIotransport Conference, Vail, Colorado. June 2023.*

3. **Teeraratkul, C.**, Tomaiuolo, M., Stalker, T. J., Mukherjee, D. Intravital Microscopy to Continuum In Silico Simulation of Flow-mediated Transport in Blood Clot Neighborhoods. *75th Annual Meeting of the American Physical Society Division of Fluid Dynamics, Indianapolis, Indiana. November 2022.*

4. **Teeraratkul, C.**, Mukherjee, D. Flow and flow mediated transport in dynamic blood clot neighborhoods. *8th Annual Rocky Mountain Fluid Mechanics Research Symposium. August 2022*

5. **Teeraratkul, C.**, Mukherjee, D. Parallel Implementation of Efficient Cell Location Algorithm On Unstructured Mesh With Applications To Immersed Finite Element Methods. *10th Annual Rocky Mountain Advanced Computing Consortium HPC Symposium. August 2022*

6. **Teeraratkul, C.**, Mukherjee, D. Immersed Discrete Element Method With Applications In Embolus Transport. *15th World Congress on Computational Mechanics, July 2022 (held online)*

7. **Teeraratkul, C.**, Mukherjee, D. Fluid-particle Interaction Using Immersed Finite Element Method With Applications In Arterial Flows. *74th Annual Meeting of the American Physical Society Division of Fluid Dynamics, Phoenix, Arizona. November 2021.*

8. **Teeraratkul, C.**, Tomaiuolo, M., Mukherjee, D. In Silico Exploration Of Driving Forces For Transport In Arterial Thrombus Neighborhood. *The 2021 Biomedical Engineering Society Annual Meeting. October 2021.*

9. **Teeraratkul, C.**, Mukherjee, D. Two-way Coupled Fluid-particle Interaction Using Immersed Finite Element Method. *7th Annual Rocky Mountain Fluid Mechanics Research Symposium. August 2021. (held online).*

10. **Teeraratkul, C.**, Mukherjee, D. Computational Model For Biochemical Transport In Large Arterial Thrombus Neighborhood. *The 16th United States National Congress On Computational Mechanics. July 2021. (held online).*

11. **Teeraratkul, C.**, Mukherjee, D. Implementation of fluid-structure interactions for rigid body motion in FEniCS using immersed finite element method. *The FEniCS 2021 Conference. March 2021 (held online)*

12. **Teeraratkul, C.**, Mukherjee, D. Hemodynamic Phenomena at the Blood-Thrombus Interface – Implications for Thrombosis. *14th World Congress on Computational Mechanics, January 2021 (held online)*

13. **Teeraratkul, C.**, Mukherjee, D. Quantification of the Hemodynamic Environment around Large Arterial Blood Clots. *73rd Annual Meeting of the APS Division of Fluid Dynamics, November 2020 (held online)*

14. **Teeraratkul, C.**, Mukherjee, D. Understanding Flow-mediated Transport in the Arterial Thrombus Neighborhood. *6th Annual Rocky Mountain Fluid Mechanics Research Symposium August 2020 (held online)*

15. **Teeraratkul, C.**, Mukherjee, D. Parallel Implementation of a Hybrid Particle-Continuum Finite Element Framework for Blood Clot Biomechanics. *10th Annual Rocky Mountain Advanced Computing Consortium HPC Symposium. May 2020 (held online)*