

Vishnunarayan Girishan Prabhu

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EDUCATION

Doctorate in Industrial Engineering Clemson University, <i>Clemson, SC</i>	<i>Aug 2022</i>
Master of Science in Industrial Engineering Clemson University, <i>Clemson, SC</i>	<i>Aug 2019</i>
Bachelor of Technology in Production Engineering University of Kerala, <i>Kerala, India</i>	<i>Nov 2015</i>

RESEARCH AND WORK EXPERIENCE

The University of North Carolina at Charlotte, North Carolina, USA Tenure-Track Assistant Professor, Industrial and Systems Engineering Affiliate Faculty, Epidemiology	<i>Aug 2022 – present</i> <i>July 2023 – present</i>
Stanford Medicine-Health Care, California, USA Operations Research Intern	<i>Jun 2021 - Jul 2022</i>
Immersive Reality Group, Montana, USA Co-Founder	<i>Jan 2020 – present</i>
PRISMA Health and Clemson University, South Carolina, USA Graduate Research Assistant Affiliate, Virtual Reality and Nature Lab	<i>Aug 2017 - Jul 2022</i> <i>Dec 2020 – present</i>

Research Expertise

Health Systems Modeling, Digital Twins, Stochastic Modeling and Data Analytics Applications in Healthcare, Mixed Methods Research, Human Behavior Modeling, Mathematical Programming, Digital Health

RESEARCH FUNDING

Total external funding: approximately \$544,000

- Principal Investigator, Stanford Medicine-Health Care (2023-2024)
- Principal Investigator, Stanford Medicine-Health Care (2022-2023)
- Cofounder, National Science Foundation (NSF) SBIR Phase 1 grant (2021-2022)
- Senior Personnel, Montana Department of Commerce (2021-2022)
- Senior Personnel, Montana Bioscience award (2021-2022)
- Epic Games MegaGrant award (2020-2021)

Total internal funding: approximately \$68,000

- Principal Investigator, UNCC Faculty Research Grant (2023-2024)
- Principal Investigator, UNCC ArtXSci Award (2022-2024)
- Principal Investigator, UNCC College of Engineering seed grant (2023)
- Co-investigator, PRISMA Health Seed grant (2020-2021)

Journals and Book Chapters

1. **Prabhu, V. G.**, Harper, S., Brignull, C. G., Snider, B., Tanner, S., Adams, K. J., Nisonson, A., Hand, W., Epling, J. A. (2023). The Impact of Virtual Reality on Pain and Anxiety during Ultrasound Guided Breast Biopsies: A Randomized Controlled Clinical Trial. *Journal of Breast Imaging*.
2. **Prabhu, V. G.**, Stanley, L., Morgan, R., & Shirley, B. (2023) Designing and Developing a Nature-based Virtual Reality with Heart Rate Variability Biofeedback for Surgical Anxiety and Pain Management: Evidence from Total Knee Arthroplasty Patients. In *Aging & Mental Health*.
3. **Prabhu, V. G.**, Hand, W., Isik, T., Song, Y., & Taaffe, K. Risk-adjusted Staffing Policies to Minimize Perioperative Staffing Shortages During a Pandemic: An Agent-Based Simulation Study. In *Epidemiology and Infection*.
4. Marston, H. R., Ko, P. C., **Prabhu, V. G.**, Freeman, S., Ross, C., Sharaievska, I., Browning, M. H., Earle, S., Ivan, L., Kanozia, R., Çalıkoğlu, H. Ö., Arslan, H., Bilir-Koca, B., Silva, P. A., Buttigieg, S. C., Großschädl, F., & Schüttengruber, G. (2023). Digital Practices by Citizens During the COVID-19 Pandemic: Findings from an International Multisite Study. *JMIR Mental Health*.
5. Browning, M.H.E.M., Shin, S., Drong, G., McAnirlin, O., Gagnon, R.J., Ranganathan, S., Sindelar, K., Hoptman, D., Bratman, G.N., Yuan, S., **Prabhu V.G.**, Heller, W. (2023). Daily Exposure to Virtual Nature Reduces Symptoms of Anxiety in College Students. In *Nature Scientific Reports*.
6. Swami, V., Tran, U.S., et al., (2023) Body appreciation around the world: Measurement invariance of the Body Appreciation Scale-2 (BAS-2) across 65 nations, 40 languages, gender identities, and age. In *Body Image*
7. **Prabhu, V. G.**, Taaffe, K., Pirrallo, R., Jackson, W., & Ramsay, M., (2022). Overlapping Shifts to Improve Patient Flow and Patient Safety in Emergency Departments. In *SIMULATION journal*.
8. **Prabhu, V. G.**, Taaffe, K., Pirrallo, R., & Shvorin, D., (2022). A Data-Driven Policy to Minimize the Tuberculosis Testing Cost Among Healthcare Workers. In *International Journal of Health Planning and Management*.
9. Joseph, A., Neyens, D., Mihandoust, S., Taaffe, K., **Prabhu V.G.**, Allison, D., & Reeves, S., (2021). Impact of Surgical Table Orientation on Flow Disruptions and Movement Patterns During Pediatric Outpatient Surgeries. *Int. J. Environ. Res. Public Health*, 18, 8114.
10. **Prabhu, V. G.**, Stanley, L., & Morgan, R., (2020). A Biofeedback Enhanced Adaptive Virtual Reality Environment for Managing Surgical Pain and Anxiety. In *International Journal of Semantic Computing*. Vol. 14, No. 03, pp. 375-393.
11. **Prabhu, V. G.**, Taaffe, K., Pirrallo, R., & Shvorin, D., (2020). Stress and Burnout among Attendings and Resident Physicians in the ED: A Comparative Study. In *IJSE Trans. Healthc. Syst. Eng.*

Conference Proceedings and Extended Abstracts

1. **Prabhu, V. G.**, Pirrallo, R., Taaffe, K., Jackson, W., Ramsay, M. Forecasting Patient Arrivals and Optimizing Physician Shift Scheduling in Emergency Departments. (2023). In the proceedings of the Winter Simulation Conference.
2. Kalatzis, A., **Prabhu, V. G.**, Stanley, L & Wittie, M.P. Effect of Augmented Reality User Interface on Task Performance, Cognitive Load, and Situational Awareness in Human-Robot Collaboration. In the Proceedings of IEEE International Conference on Robot and Human Interactive Communication (RO-MAN).
3. Foster, S., Hegde, S., Pirrallo, R., **Prabhu, V.G.**, Taaffe, K., Ramsay, M., & Jackson, B. (2023). Evaluating Physician Stress During Patient Handoffs: Analysis of Physician Heart Rate Variability, Patient Handoff Characteristics, and ED Metrics. In the Proceedings of the Human Factors and Ergonomics Society.
4. Kalatzis, A., Rahman, S., **Prabhu, V. G.**, Stanley, L & Wittie, M. (2023). A Multimodal Approach to Investigate the Role of Cognitive Workload and User Interfaces in Human-Robot Collaboration. In the proceedings of the International Conference on Multimodal Interaction.
5. **Prabhu, V. G.**, Taaffe, K., Shehan, K., Pirrallo, R., Jackson, W., Ramsay, M., & Hobbs, J. (2022). How Does Imaging Impact Patient Flow in Emergency Departments? In the proceedings of the Winter Simulation Conference.

6. Kalatzis, A., **Prabhu, V. G.**, Rahman, S., Wittie, M., & Stanley, L., (2022). Emotions Matter: Towards Personalizing Human-System Interactions Using a Two-layer Multimodal Approach. In the Proceedings of International Conference on Multimodal Interaction.
7. Kalatzis, A., Teotia, A., **Prabhu, V. G.**, & Stanley, L., (2021). Affective State Classification in Virtual Reality Environments Using Electrocardiogram and Respiration Signals. In the Proceedings of International Conference on Artificial Intelligence and Virtual Reality (AIVR).
8. **Prabhu, V. G.**, Taaffe, K., Pirrallo, R., Jackson, W., & Ramsay, M., (2021). Physician Shift Scheduling to Improve Patient Safety and Patient Flow in the Emergency Department. In the Proceedings of Winter Simulation Conference
9. **Prabhu, V. G.**, Stanley, L., Morgan, R., & Shirley, B., (2021). Comparing the Efficacy of a Video and Virtual Reality Intervention to Mitigate Surgical Pain and Anxiety. In the proceedings of the International Conference on Human Interaction & Emerging Technologies
10. Kalatzis, A., Teotia, A., **Prabhu, V. G.**, & Stanley, L., (2021). A Database for Cognitive Workload Classification Using Electrocardiogram and Respiration Signal. In the proceedings of the Applied Human Factors and Ergonomics Conference.
11. **Prabhu, V. G.**, Taaffe, K., Hand, W., ÇAĞLAYAN, C, Isik, T., & Song, Y., (2020). Team Based-Risk Adjusted Staffing During a Pandemic: An Agent Based Approach. In the proceedings of the Winter Simulation Conference (WSC).
12. **Prabhu, V. G.**, Taaffe, K., Pirrallo, R., Jackson, W., & Ramsay, M., (2020). Reducing Handoffs and Improving Patient Flow in the ED. In the proceedings of the Winter Simulation Conference (WSC).
13. **Prabhu, V. G.**, Taaffe, K., & Pirrallo, R., (2020). A Multi-Layered LSTM for Predicting Physician Stress during an Emergency Department Shift. In the proceedings of Annual IISE Conference.
14. **Prabhu, V. G.**, Stanley, L., Linder, C., & Morgan, R., (2020). Analyzing the Efficacy of a Restorative Virtual Reality Environment using HRV Biofeedback for Pain and Anxiety Management. In the proceedings of the IEEE International Conference on Human-Machine Systems (ICHMS), Rome, Italy.
15. **Prabhu, V. G.**, Taaffe, K., & Pirrallo, R., (2019). Patient Care Management for Physicians: Reducing Handoffs in the ED. In the Proceedings of Winter Simulation Conference (WSC).
16. **Prabhu, V. G.**, Linder, C., Stanley, L., & Morgan, R., (2019). An Affective Computing in Virtual Reality Environments for Managing Surgical Pain and Anxiety. In the Proceedings of International Conference on Artificial Intelligence and Virtual Reality (AIVR), San Diego, CA.
17. Cull, E., Saha, A., Stanley, L., **Prabhu, V. G.**, & Biro, J., (2019). Analyzing the Efficacy and Design Considerations of VR Environments to Manage Anxiety & Depression in AYA Cancer Patients, In Blood 134 (Supplement-1).

Manuscripts Under Review, Revision and In Press

1. **Prabhu, V. G.** Book Chapter on Hybrid Modeling and Simulation: Conceptualizations, Methods, and Applications. Hybrid Modeling and Simulation: Trends and Applications in Healthcare. *(In Press)*.
2. Stanley, L., & **Prabhu, V.G.** Book Chapter on Realizing Complex Integrated Systems. Volume 4: Chapter 10 - Human System Interaction - Interface Design. *(In Press)*.
3. **Prabhu, V. G.**, Pirrallo, R., Taaffe, K., Joshi, V., Jackson, W., Ramsay, M. Forecasting Long- and Short-term Patient Arrivals with Severity Levels to Emergency Departments. *Journal of the American College of Emergency Physicians Open. (Review)*.
4. **Prabhu, V. G.**, Pirrallo, R., Taaffe, K., Hegde, S., Jackson, W., Ramsay, M., Hobbs, J. Handoffs in Emergency Departments: Physician Perspectives, Preferences, and Strategies. *Journal of Emergency Medicine. (Review)*.

AWARDS

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- Clemson Graduate Student Government Travel grant, (2019, 2020, 2021)
 - Outstanding Graduate Research Assistant of the Year, Dept. of Industrial Engineering, Clemson University (2022)
 - Teaching Assistant of the Year Award, Dept. of Industrial Engineering, Clemson University (2021)
 - Best Graduate Student Leader Award, Department of Emergency Medicine, PRISMA Health (2018)
 - University topper for undergraduate senior year (9.41/10), University of Kerala (2015)

TEACHING EXPERIENCE

The University of North Carolina at Charlotte, North Carolina, USA

- EMGT 6906 - Processing Systems Simulation *Fall'23*
- EMGT 5090/SEGR 4090 - Health Systems Modeling (**New Course Development**) (Rating: 4.5/5.0) *Summer'23*
- EMGT 5201/SEGR 4201 - Deterministic System Analysis (Rating: 4.9/5.0) *Spring'23*
- SEGR 2105 - Computational Methods for Systems Engineering (Rating: 4.5/5.0) *Fall'22*

Clemson University, South Carolina, USA

- IE 4610 Quality Engineering (Rating: 4.3/5.0) *Spring'21*
- Teaching Assistant, IE 4820/6820 Systems Modeling *Fall'18,19,20*
- Teaching Assistant, IE 4910/6910 Healthcare Systems Modeling *Spring'20*

ADVISING AND MENTORING

Master's Thesis Students

- Shweta Prasad (May 2024 Expected) – Research in collaboration with Prisma Health, SC
- Ankit Prasad (May 2024 Expected) – Research in collaboration with Atrium Health, NC
- Sheen Mashinkarjavan (May 2024 Expected) – Research in collaboration with Prisma Health, SC

Master's Capstone Students

- Avinash Vankudoth (Spring 2023) – Project in collaboration with Prisma Health, SC
- Pooja Gambhire (Spring 2023) – Project in collaboration with Bharat Forge Aluminum, NC
- Silviya Antony (Fall 2023) - Project in collaboration with Prisma Health, SC
- Pradeep Narayan (Fall 2023) - Project in collaboration with Prisma Health, SC
- Sai Shravan (Spring 2024 Expected) – Research in collaboration with Continental Tires, NC
- Jamiyah C. Castleberry (Spring 2024 Expected)
- Jason R. Easterling (Spring 2024 Expected)
- Aptheeri Chakradhar Reddy (Spring 2024 Expected)
- Abhishek Gowda Lokesh (Spring 2024 Expected)
- Kriti Kumari (Spring 2024 Expected)
- Adwait Girish Nehete (Spring 2024 Expected)
- Supriya Pandita (Spring 2024 Expected)
- Raphel Rajkumar (Spring 2024 Expected)
- Geethika Uppara (Spring 2024 Expected)
- Pochi Reddy Veerannagari (Spring 2024 Expected)

Undergraduate Senior Design Students

- Michael Gonzalez
- Charlie Haller
- Amber Mossembekker
- Jonah Shuda
- Madeline Umscheid

SERVICE & VOLUNTEERING

Proposal Reviewer and Panelist

- National Science Foundation Reviewer (2022-present)
- National Science Foundation Panelist (2023-present)

Editorial Roles

- Editor for Human Factors in Healthcare
- Associate Editor for Digital Transformation and Society Journal
- Review Editor for Frontiers in Public Health (Digital Public Health)

- Session's chair and Reviewer for Winter Simulation Conference, 2020, 2022, 2023

Journal Reviewer Roles

- Reviewer for JMIR
- Reviewer for Cureus
- Reviewer for Sensors
- Reviewer for Simulation
- Reviewer for Healthcare
- Reviewer for Informatics
- Reviewer for Sustainability
- Reviewer for Nursing Reports
- Reviewer for Applied Sciences
- Reviewer for BMC Digital Health
- Reviewer for Behavioral Sciences
- Reviewer for JMIR Serious Games
- Reviewer for Indian Heart Journal
- Reviewer for Frontiers in Psychology
- Reviewer for JMIR Medical Education
- Reviewer for Frontiers in Public Health
- Reviewer for JMIR Research Protocols
- Reviewer for JMIR Formative Research
- Reviewer for Frontiers in Digital Health
- Reviewer for Frontiers in Epidemiology
- Reviewer for Journal of Clinical Medicine
- Reviewer for Discover Artificial Intelligence
- Reviewer for Frontiers in Computer Science
- Reviewer for International Journal of Surgery
- Reviewer for Open Access Emergency Medicine
- Reviewer for Drug, Healthcare and Patient Safety
- Reviewer for JMIR Journal of Participatory Medicine
- Reviewer for Journal of Evaluation in Clinical Practice
- Reviewer for Risk Management and Healthcare Policy
- Reviewer for American Journal of Veterinary Research
- Reviewer for European Journal of Operational Research
- Reviewer for International Journal of Industrial Ergonomics
- Reviewer for Complementary Therapies in Clinical Practice Journal
- Reviewer for Disaster Medicine and Public Health Preparedness Journal
- Reviewer for International Journal of Environmental Research and Public Health
- Reviewer for IISE Annual Conference
- Reviewer for IEEE SoutheastCon 2021
- Clemson University Aspire Graduate Peer Mentor
- IEEE Young Professional Vice Chair for Region 3 Piedmont Section

Professional Affiliations

- Human Factors Ergonomics Society (HFES)
- Institute of Industrial and Systems Engineers (IISE)

- Society for Health Systems (SHS)
- Institute of Electrical and Electronics Engineers (IEEE)
- INFORMS
- Alpha Pi Mu Honor Society - Industrial Engineering Honor Society