

# Sangwon Seo

☎ (832) 839-3228 | ✉ sangwon.seo@rice.edu | 🏠 sangwonseo.com  
in sangwon91 | 🐦 SangwonSeo\_ | 🎓 Google Scholar

## RESEARCH OBJECTIVES

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My research centers on Human-Robot Collaboration, Human-Centered AI, and Team-Assistive AI. During my Ph.D., I have developed computational and machine learning-based methods to improve both human-human and human-robot teamwork.

## EDUCATION

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**RICE UNIVERSITY**, HOUSTON, TX *Aug 2019 – Present*

PH.D. IN COMPUTER SCIENCE

- Thesis (Tentative): AI-Assisted Teamwork

**SEOUL NATIONAL UNIVERSITY**, SEOUL, SOUTH KOREA *Mar 2013 – Feb 2015*

M.S IN BIOENGINEERING

- Thesis: Performance Enhancement in Heart Rate Variability Analysis with Constrained Missing RR Interval Estimation

**SEOUL NATIONAL UNIVERSITY**, SEOUL, SOUTH KOREA *Mar 2009 – Feb 2013*

B.S. IN ELECTRICAL AND COMPUTER ENGINEERING

- Thesis: Multiplexing of Bead-Based Immunoassays using a BioMEMS

## RESEARCH EXPERIENCE

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**HUMAN-CENTERED AI AND ROBOTICS GROUP**, RICE UNIVERSITY *Aug 2019 – Present*

PH.D. CANDIDATE (ADVISOR: PROF. VAIBHAV UNHELKAR)

- Proposed an automated task-time intervention system to improve teamwork during tasks
- Developed sample- and label-efficient imitation learning algorithms to learn a generative model of team behavior
- Developed a hierarchical imitation learning algorithm to learn the intentional behavior of experts from demonstrations
- Implemented multiple web-based teamwork simulators

**BIOMEDICAL SIGNAL AND INFORMATION LAB**, SEOUL NATIONAL UNIVERSITY *Feb 2013 – Feb 2015*

M.S STUDENT (ADVISOR: PROF. KWANG SUK PARK)

- Developed signal processing algorithms for daily monitoring of physiological signals
- Developed autoregressive-moving-average-based interpolation methods to fill in missing RR-interval values to enhance heart rate variability analysis

**BIOPHOTONICS AND NANO ENGINEERING LAB**, SEOUL NATIONAL UNIVERSITY *Dec 2011 – Jun 2012*

RESEARCH INTERN (ADVISOR: PROF. SUNGHOON KWON)

- Designed and implemented biomedical microelectromechanical systems (Bio-MEMS)

## INDUSTRY EXPERIENCE

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**CORELINE SOFT**, SEOUL, SOUTH KOREA *Apr 2016 – June 2019*

ASSOCIATE RESEARCH ENGINEER

- Responsible for developing algorithms for AVIEW MODELER, a medical 3D printing solution
- Developed geometric modeling and processing algorithms
- Implemented a volume and surface rendering pipeline

**AGENCY FOR DEFENSE DEVELOPMENT**, DAEJEON, SOUTH KOREA *Mar 2015 – Mar 2016*

RESEARCHER

- Developed a telemetry system for aircraft

\* My employment at the Agency for Defense Development and Coreline Soft is recognized as fulfilling the compulsory military service in South Korea.

## PUBLICATIONS

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### FULL PAPERS

- **S. Seo** and V. V. Unhelkar, "IDIL: Imitation Learning of Intent-Driven Expert Behavior", *23rd International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2024 (Acceptance rate 25%) [To appear; PDF available upon request]
- **S. Seo**, B. Han and V. V. Unhelkar, "Automated Task-Time Interventions to Improve Teamwork using Imitation Learning", *22nd International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2023 (Acceptance rate 23.3%)
- **S. Seo** and V. V. Unhelkar, "Semi-Supervised Imitation Learning of Team Policies from Suboptimal Demonstrations", *31st International Joint Conference on Artificial Intelligence (IJCAI)*, 2022 (Acceptance rate 14.9%)
- **S. Seo**, L. R. Kennedy-Metz, M. A. Zenati, J. A. Shah, R. D. Dias and V. V. Unhelkar, "Towards an AI coach to infer team mental model alignment in healthcare", *2021 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA)*, pp. 39-44, 2021
- S. Kwon, D. Lee, J. Kim, Y. Lee, S. Kang, **S. Seo** and K. Park, "Sinabro: A smartphone-integrated opportunistic electrocardiogram monitoring system", *Sensors*, 16(3), p.361, 2016
- S. H. Hwang, **S. Seo**, H. N. Yoon, H. J. Baek, J. Cho, J. W. Choi, Y. J. Lee, D.-U. Jeong and K. Park, "Sleep period time estimation based on electrodermal activity", *IEEE journal of biomedical and health informatics (J-BHI)*, 21(1), pp.115-122, 2015
- S. Kang, S. Kwon, C. Yoo, **S. Seo**, K. Park, J. Song and Y. Lee, "Sinabro: Opportunistic and unobtrusive mobile electrocardiogram monitoring system", *15th Workshop on Mobile Computing Systems and Applications (HotMobile)*, pp. 1-6, 2014

### SHORT PAPERS

- **S. Seo**, "AI-Assisted Human Teamwork", *AAAI-24 Doctoral Consortium*, 2024
- M. Khalid, **S. Seo**, M. A. Zenati, M. Ebnali, L. R. Kennedy-Metz, R. D. Dias, V. V. Unhelkar and E. Salas, "Opportunities and Challenges of Real-Time Measurement of Team Performance on the Cardiac Operating Room", *Human Factors and Ergonomics Society (HFES) 67th International Annual Meeting*, 2023
- J. Kim, S. Kwon, **S. Seo** and K. Park, "Highly wearable galvanic skin response sensor using flexible and conductive polymer foam", *36th annual international conference of the IEEE engineering in medicine and biology society (EMBC)*, pp. 6631-6634, 2014

## HONORS & AWARDS

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**NATIONAL SCHOLARSHIP FOR SCIENCE AND ENGINEERING**, KOREA STUDENT AID FOUNDATION Mar 2009

## TEACHING EXPERIENCE

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### TEACHING ASSISTANT

**COMP 646: DEEP LEARNING FOR VISION AND LANGUAGE** (PROF. VICENTE ORDÓÑEZ-ROMÁN) Spring 2023  
**COMP 440/557: ARTIFICIAL INTELLIGENCE** (PROF. DEVIKA SUBRAMANIAN) Fall 2021

## ADVISING & MENTORING

**ARNAV ADHIKARI**, HIGH SCHOOL STUDENT, HOUSTON, TX  
**BING (TIM) HAN**, UNDERGRADUATE STUDENT, RICE UNIVERSITY  
**ZHANYI SUN**, UNDERGRADUATE STUDENT, RICE UNIVERSITY

*May 2023 – Present*  
*May 2022 – Present*  
*Jan 2022 – Jun 2022*

## REVIEWER

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**INTERNATIONAL CONFERENCE ON AUTONOMOUS AGENTS AND MULTIAGENT SYSTEMS (AAMAS)**  
**INTERNATIONAL CONFERENCE ON ADVANCED ROBOTICS AND ITS SOCIAL IMPACTS (ARSO)**  
**ROBOTICS AND AUTOMATION LETTERS (RA-L)**  
**INTERNATIONAL CONFERENCE ON ROBOTICS AND AUTOMATION (ICRA)**

## SKILLS

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<b>PROGRAMMING LANGUAGES</b>	Python   C   C++   Javascript   HTML   SQL   Matlab   LaTeX
<b>FRAMEWORKS &amp; LIBRARIES</b>	OpenGL   OpenMP   Flask   Gym   PyTorch   Tensorflow   WandB
<b>SOFTWARE DEVELOPMENT</b>	Git   Docker   CMake   VSCode   Jupyter
<b>ROBOT DEVELOPMENT</b>	Motion Capture (OptiTrack)   ROS   MoveIt   OMPL
<b>LANGUAGES</b>	English   Korean

## EXTRA

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**AAMAS STUDENT VOLUNTEER**  
**STUDENT VENTURE NETWORK**, SEOUL NATIONAL UNIVERSITY  
**COLLEGE OF ENGINEERING TENNIS CLUB**, SEOUL NATIONAL UNIVERSITY  
**SYSTEM ADMINISTRATOR**, ECE DEPARTMENT, SEOUL NATIONAL UNIVERSITY  
**SNU MENTORING**, SEOUL NATIONAL UNIVERSITY  
ONLINE MENTORING FOR LOCAL HIGH SCHOOL STUDENTS

*2023*  
*Mar 2012 – July 2012*  
*Mar 2010 – Feb 2013*  
*Mar 2010 – Feb 2011*  
*Sep 2009 – Feb 2010*