

Last Updated: Sep 25th, 2023
Chapel Hill, NC, United States
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Masashi Sode

PhD Candidate in Biomedical Engineering

Portfolio
github.com/MasashiSode
[linkedin.com/in/masashisode](https://www.linkedin.com/in/masashisode)

EDUCATION

PhD Candidate in Biomedical Engineering <i>Joint Department of Biomedical Engineering, UNC-Chapel Hill/NC State (https://bme.unc.edu/), Chapel Hill, North Carolina, United States supervisor Gianmarco Pinton</i>	Aug 2023-
Master of Engineering in Aerospace Engineering <i>Graduate School of Engineering, Tohoku University (www.tohoku.ac.jp), Sendai, Miyagi, Japan</i>	Mar 2019 GPA 4.0/4.0
Bachelor of Science in Engineering <i>School of Engineering, Tohoku University, Sendai, Miyagi, Japan</i>	Mar 2017 GPA 3.6/4.0

SKILLS

Research skills:	Ultrasound imaging, Medical AI development Deep learning (Advanced) Machine learning Multi-modal deep learning (image, table, graph structure) (Advanced) High-performance computing (Advanced) distributed AI training on multi machine, multi GPU environment (Advanced) Mathematical optimization, Bayesian optimization (Advanced) computational solid mechanics with finite element method (FEM) (Advanced) computational fluid dynamics with finite volume method (FVM) (Intermediate) Electronics (Basic)
Programming:	Python (Advanced) , Fortran (Advanced), C (Intermediate), C++ (Intermediate) test driven development (Advanced), docker, singularity
Framework:	PyTorch (Advanced) , FastAPI, etc.
Platform:	Linux (Advanced, my main OS is Ubuntu) , Windows (Advanced)
Writing tools:	\LaTeX (Advanced, this CV is written with \LaTeX), Markdown (Advanced)
Other tools:	Git, GitHub, Slack, Google/Microsoft software suites, etc.
Communication:	Japanese (native), English (fluent speaker), German (fluent speaker)

WORK/RESEARCH EXPERIENCE

AI Engineer / Developing a method to diagnose influenza from throat images using deep learning <i>Aillis, Inc. (www.aillis.jp) (Startup company)</i>	Oct 2019 — Aug 2023 <i>Tokyo, Japan</i>
<ul style="list-style-type: none">In a biomedical startup company, I led the AI team from prototyping to commercialization of an influenza diagnosis AI as a key developer and researcher of the AI team. I successfully completed the project from prototype to clinical trial in a short time by working closely with physicians, the hardware team, and the software/AI team as a collaborative research project.The influenza diagnosis AI predicts influenza infection from multiple throat images and clinical information using multi-view and multi-modal deep learning. I proposed and developed a number of significant methods and integrated the ideas into the medical AI for the clinical trial.Our collaborative team conducted a clinical trial, and the medical AI system received regulatory approval (Japanese press release link) in Japan in April 2022. This is the first time a prospective study of a medical AI device has been conducted in Japan. For reference, only four products out of 130 medical AI devices have been approved by the U.S. FDA as of April 2022.I developed the AI model using the supercomputer ABCI (https://abci.ai/) from the National Institute of Advanced Industrial Science and Technology. This supercomputer has a world-leading computing power of 550 AI-PFLOPS with 4,352 NVIDIA V100 GPUs.	
AI Engineering Intern / Developed a device to collect patient data in a clinical research and clinical trial. <i>Aillis, Inc. (www.aillis.jp) (Startup company)</i>	Jul 2019 — Oct 2019 <i>Tokyo, Japan</i>
<ul style="list-style-type: none">I led the data collection phase for the development of the influenza diagnosis AI. I mainly developed a console device to collect patient data in medical institutions for clinical research in Japan.With the device I developed, clinical research was conducted in Japan in 2019, and more than 10,000 patients' clinical information and 500,000 throat images were collected from about 100 medical institutions to build a unique pharynx image database.	
AI Engineering Intern / Sleep stage classification from EEG signal using deep learning <i>PGV Inc. (www.pgv.co.jp) (Startup company)</i>	Apr 2019 — Jul 2019 <i>Tokyo, Japan</i>
<ul style="list-style-type: none">I supported the development of AI models for sleep stage classification from EEG signals and related software.	

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Leading Position of Research Team / Aircraft design using multi-objective Bayesian optimization

Apr 2015 — Mar 2019

Tohoku University (*bachelor to master*)

Miyagi, Japan

- I conducted research on multi-objective Bayesian optimization for composite aircraft design under the supervision of Professor Okabe (research topic of bachelor's and master's theses). I led the collaborative research with Kawasaki Heavy Industries, Toray Industries, and three aerospace engineering laboratories.
- To create the automated aircraft design method, I integrated the Genetic Algorithm, Multi-Objective Bayesian Optimization with Gaussian Process (github.com/MasashiSode/MOBO), solid mechanics simulation with FEM written in C, fluid dynamics simulation with FVM written in Fortran, and fluid-structure interaction method into a Python library with a high-performance computing environment in Linux.

ACCOMPLISHMENTS

Publications

1. Okiyama S, Fukuda M, **Sode M**, Takahashi W, Ikeda M, Kato H, Tsugawa Y, Iwagami M. Diagnosing Influenza Infection from Pharyngeal Images using Deep Learning: Machine Learning Approach. J Med Internet Res. 2022 Oct 31. doi: [10.2196/38751](https://doi.org/10.2196/38751). forthcoming/in press. PMID: [36374004](https://pubmed.ncbi.nlm.nih.gov/36374004/).

Patents

I am the inventor of **three patent applications** related to the influenza diagnostic AI system at Aillis, Inc. However, the application numbers and content of the inventions cannot be disclosed due to the current contract with the company.

Conference Presentations

1. **M. Sode**, N. Ishiura, Y. Nagumo, T. Okabe, Aero-Structural Optimization of a Regional Jet Wing with Failure Criterion, 33rd New Materials Engineering Conference, Fukushima, Japan, 5 - 7 Sep. 2017
2. **M. Sode**, N. Ishiura, Y. Nagumo, T. Okabe, Aero-Structural Optimization of an Aircraft Wing with Failure Criterion, 42nd Composite Material Symposium, Miyagi, Japan, 14 - 15. Sep. 2017
3. **M. Sode**, N. Ishiura, Y. Nagumo, T. Okabe, Multidisciplinary Optimization of Regional Jet Wing, 55th Aircraft Symposium, Shimane, Japan, 20 - 22. Nov. 2017

Major Awards

1. **First Prize: PyTorch Global Summer Hackathon 2020** (<https://pytorch.org/blog>) Jun 2020 — Aug 2020
My team won first place for developing a Python library to mitigate the unfairness in machine learning by using constrained optimization.
2. **Grant: Boeing Higher Education Program 2016** (www.ifs.tohoku.ac.jp) 2016
Tohoku University participated in the Boeing Higher Education Program and received a grant from The Boeing Company to produce excellent scientists and engineers who will carry the world's future. Through this grant, I developed an aircraft design method with aero-structural optimization and integrated it into a Python library.

TEACHING EXPERIENCE

- 1. Mathematics for Engineering Class Tutor** **Apr 2017 — Aug 2017**
Tutored first-year undergraduate students in math for engineering using math exercises.
- 2. Aircraft Design Class Tutor** **Apr 2016 — Aug 2016**
Tutored first-year undergraduate students in general knowledge of aircraft design.

COMMUNITY SERVICE

- 1. AFS Intercultural Program Volunteer** **Apr 2013 — Mar 2019**
AFS Intercultural Programs, Japan (www.afs.or.jp) *Japan*
 - I supported the international exchange students and Japanese high school students by organizing the orientation and international camps. I studied abroad in Germany for a year (Feb 2011 - Jan 2012) through this organization when I was in high school.
 - AFS Intercultural Programs (<https://afs.org>) is an international youth exchange organization that has been providing intercultural learning opportunities through high school exchange programs since 1914.
- 2. Program Head of AFS International Camp** **Jan 2018 — Aug 2018**
AFS Intercultural Programs, Japan (www.afs.or.jp) *Japan*
 - I organized the AFS international camp for high school and exchange students.
- 3. IPLANET Tutor** **Apr 2014 — Mar 2017**
Tohoku University *Miyagi, Japan*
 - I helped exchange students at Tohoku University.

HOBBY

- Attending Kaggle competition
- Attending hackathon for learning something new
- Electronics (making a head up display)
- Playing guitar
- Nature observation
- Reading