Masaru NAGASO

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Experience

**01.june.2019
−31.may.2021**
Postdoctral research assistant, CNRS-LMA, Marseille, France.
Co-lead developer of SPECFEM3D for ChEESE project, which is the international project in the domain of geoscience for preparing Exascale HPC founded from the European Union's Horizon 2020. I/O optimization and designing/developing a workflow toward a full-wave inversion calculation on Exascale HPC machines.

**01.oct.2018
−31.may.2019**
Scientific researcher, Protisvalor/IUT-LCND, Aix-en-Procenve, France.
Large-scale numerical simulation of an ultrasonic wave in new generation of Sodium-cooled Fast Reactors (SFR) with Spectral Element Method (SEM: higher-order finite element method).
Development of a numerical library for accessing a large size calculation data and post-processing.

**01.jan.2016
−30.jun.2019**
Scientific software developer, Hanoi, Vietnam (Remote).
Development of scientific computation libraries.
- Network hierarchical clustering application which performs Louvain method for calculating Modularity, Map equation.
- Python scripts for Natural Language Processing (NLP).
- Web scraping system for parallel and massive data acquisition.
- Numerical library for Alzheimer's "Disease time" estimation which partly uses Nonlinear mixed effect and covariate modeling.

**02.fev.2015
−31.may.2018**
PhD candidate, CEA Cadarache, Saint-Paul-lez-Durance, France.
Research and development on numerical modeling method for a wave propagation in a realistic fluctuating acoustic medium.
2D and 3D elasto-acoustic wave propagation simulation in Sodium-cooled fast reactors, which is an application for acoustic thermometry to detect accurate and instantaneous temperature in sodium jets.

Education

2015–2018 **PhD**, *Aix-Marseille University*, Aix-en-Procenve, France.
Acoustics

2011–2014 **MSc**, *The University of Tokyo*, Tokyo, Japan.
Ocean Technology, Policy and Environment

2007–2011 **BSc**, *Tokyo University of Science*, Chiba, Japan.
Mechanical Engineering

PhD thesis

title *Study of ultrasound wave propagation in a heterogeneous fluid medium for the continuous monitoring of an operating sodium-based nuclear reactor*

supervisors	Dr. Dimitri Komatitsch, Prof. Joseph Moysan
	(Laboratoire de mécanique et dacoustique(LMA), CNRS/Luniversité dAix-Marseille)
	Dr. Christian Lhuillier
	(Le Laboratoire d'instrumentations et d'essais technologiques, CEA Cadarache)
description	Application of spectral element method and finite-element time-domain methods for wave propagation simulation in a heterogeneous medium.
	Numerical modeling of a wave propagation in side of 4th generation sodium cooled fast reactor.
	Two french super computers, CURIE@TGCC/CEA, OCCIGEN@CINES were used for making 4D (3D wave simulation + temporal fluctuating heterogeneous situation) massive calculations.

Master thesis

title	*Development of the three-dimensional visualization and measurement method for identification of sex and species of small size fish using 25MHz-focusing acoustic probe.*
supervisors	Prof. Akira Asada
	(The Underwater Acoustic System Engineering Laboratory, Institute of Industrial Science, The University of Tokyo)
description	Acoustic measurement of fish bodies using a high-frequency focusing acoustic probe.
	Development of a software for acoustic signal processing and 3D visualization of fish bodies, acoustic reflection intensity image of body surface and internal organs.
	FDTD simulation of a wave propagation inside of fish bodies.
	(Implementation of FDTD for elastic wave and PML damping layer.)

Bachelor thesis

title	*Elasto-plastic J-integral calculation using the tetrahedral finite element model.*
supervisors	Prof. Hiroshi Okada
	(The Laboratory of Computational Solid Mechanics, Tokyo University of Science)
description	Application of J-integral method to elasto-plastic FEM analysis using tetrahedral mesh.
	Improvement of mesh generation software for FEM analysis

Weekend projects

subject	*Network clustering application*
description	Implementation of hierarchical network clustering code based on Map equation and Modularity.
	Keywords: Map equation, Modularity, Louvain method, Page rank,
subject	*The numerical computation library for estimation of subject times*

description	Python library for calculating the subject time (i.e. temporal position indicating the degree of progress in a disease) written in C++ and wrapped by swig.
	In the calculation routine of this library, nonlinear mixed effect modeling was implemented for calculating averaged curves of multiple bio-markers (i.e. fixed effects) and random parts which depends on each subject.
	Golden search algorithm was also implemented during the routine.
	This code was developed as a part of research project by Dr. Keita Tokuda, a project researcher at The University of Tokyo Hospital.
	Keywords: Maximum likelihood estimation, Nonlinear mixed effect model, Golden search.
subject	*Improvement of multi-label classification using C2AE and fine-tuning with Transformer-lm*
description	In order to improve the accuracy of multi-label classification task with Canonical Correlated AutoEncoder (C2AE) for limited amount of input texts, we applied the method of "Improving Language Understanding by Generative Pre-Training" so called (finetune-transformer-lm).
	Keywords: Natural language processing, Deep Learning, multi-label classification, Transformer, Language model, C2AE
subject	*Generation of semantic networks with review texts of popular products and generation of learning model for creating a new hit product*
description	This is a part of another research project on "computational creativity" by Dr. Akihito Sudo, a researcher/research manager at The University of Shizuoka.
	First, we generates two semantic networks, one is generated from reviews texts written for a hit product and another is from reviews for multiple products in the category which the target product belongs to.
	By using these semantic networks and difference between them as a data set, we are trying to generate learning model to generate keywords for the next hit products.
	Keywords: Natural language processing, word2vec, Semantic network, Machine learning, SMOTE.
subject	*Web scraping scripts*
description	This is a set of scraping scripts developed for gathering review texts from Amazon.com/co.jp for generating semantic networks concerning the above project.
	A python library "Scrapy" was used as the engine of scraping spiders.
	Keywords: Web Scraping,

Technical skills

Operating systems	Linux, OS X, Windows, Slurm, Gcloud
Programming languages etc.	C, C++, C#, Fortran, Python, Swig, MPI, OpenMP, VTK, HDF5, Chuck, Markdown, LaTeX
Web tools	xhtml, css, JavaScript, Node.js, MySQL, Mongodb, Google Big Query
Development environments	Singularity, Docker, Vim, Visual Studio Code, Git, SVN, Redmine, Bitbucket
Analysis tools	Jupyter notebook (lab), Matplotlib, Holoviews
Other softwares	Microsoft Word, Excel, PowerPoint, Adobe Photoshop, Adobe Illustrator, Gimp, Inkscape
Music theory	Knowledge and some experiences of modal/codal music
Instruments	Piano, Hammond Organ, Synthesizer, Saxophones

Languages

○ Japanese (First language)

○ English (Business)

○ French (Basic)

Conferences

2017 8th ANNIMA (International conference on Advancements in Nuclear Instrumentation Measurement Methods and their Applications) in Liège. Poster session.

2016 19th WCNDT (World Conference on Non-Destructive Testing) in Munich. Oral session.

2013 Oceans 13 MTS/IEEE in San Diego. Student Poster Competition.

Publications

M. Nagaso. *Study of ultrasound wave propagation in a heterogeneous fluid medium for the monitoring of an operating sodium-based nuclear reactor.* Theses, Université d'Aix Marseille, May 2018.

M. Nagaso, D. Komatitsch, J. Moysan, and C. Lhuillier. Numerical simulation of ultrasonic wave propagation in a sodium cooling system in an inhomogeneous temperature field using the spectral-element method. In *19th World Conference on Non-Destructive Testing*, Münich, Germany, Jun 2016.

M. Nagaso, D. Komatitsch, J. Moysan, and C. Lhuillier. Wave propagation simulation in the upper core of sodium-cooled fast reactors using a spectral-element method for heterogeneous media. *8th ANNIMA*, 170:03006, 2018.

M. Nagaso, K. Mizuno, A. Asada, K. Kobayashi, and M. Matsukawa. Development of the three-dimensional visualization method for the inner structure of small size fish using 25 mhz acoustic profile measurement. In *2013 OCEANS - San Diego*, pages 1–4, Sept 2013.

M. Nagaso, K. Mizuno, A. Asada, K. Kobayashi, and M. Matsukawa. Experimental and finite-difference time-domain simulation study of the precise measurement

of the gonad of a small fish using a 25-mhz acoustic focus probe. *Marine Technology Society Journal*, 49(5):31–37, Sept 2015.

M. Nagaso, J. Moysan, S. Benjeddou, N. Massacret, M. A. Ploix, D. Komatitsch, and C. Lhuillier. Ultrasonic thermometry simulation in a random fluctuating medium: Evidence of the acoustic signature of a one-percent temperature difference. *Ultrasonics*, 68:61–70, May 2016.

M. Nagaso, J. Moysan, and C. Lhuillier. 4d numerical simulations of ultrasonic wave propagation in liquid metal (under peer review). *Ultrasonics*, ? 2021.

References

Dr. Dimitri Komatitsch
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