Georgios Kissas

DATE OF BIRTH	6 March 1991

CONTACT INFORMATION

2105 Locust Street,
Philadelphia, PA, 19103

Phone: +1 2679015988/ +41 789699577
E-mail: gkissas@seas.upenn.edu

EDUCATION

University of Pennsylvania, Philadelphia, PA, USA

PhD, Mechanical Engineering and Applied Mechanics, August, 2018 - March 2023 (Expected)
Advisor: Paris Perdikaris

National Technical University of Athens, Athens, Greece

M.S., Computational Mechanics (Fluids), May, 2017, (2nd Highest GPA)
Thesis: *"A computational study of Self-Consistent Field Theory for polymer interfaces"*
Advisor: Doros Theodorou

University of Patras, Patras, Greece

Diploma, Mechanical and Aeronautical Engineering, February, 2015 (Honors)
Thesis: *"A comparative study of Wavelet and Hilbert-Huang Transformations for fault detection in slew ring bearings"*
Advisor: Pantelis Nikolakopoulos

HONORS AND AWARDS

MEAM Department Outstanding TA Award, 2021

Gerondellis Foundation Scholarship Award, 2020

MIT Travel Grant for Conference *Learning for Dynamical Systems and Control*, 2019

University of Pennsylvania Fellowship Award, 2017

Limmat Stiftung Award for Academic Excellence, 2017

PUBLICATIONS

Seidman, J.H.*, **Kissas, G.** *, Pappas, G.J., and Perdikaris, P., 2023. Variational Autoencoding Neural Operators.

Kissas, G.*, Seidman *, J.H., Guilhoto, L.F., Preciado, V.M., Pappas, G.J. and Perdikaris, P., 2022. Learning Operators with Coupled Attention. *Thirty-sixth Conference on Neural Information Processing Systems* (***Spotlight/Oral-equivalent Presentation***)

Seidman, J.H.*, **Kissas, G.** *, Perdikaris, P. and Pappas, G.J., 2022. NOMAD: Nonlinear Manifold Decoders for Operator Learning, *Thirty-sixth Conference on Neural Information Processing Systems.* (***Featured in the "Paper of the Week" section of DeepAI***)

Kissas, G.*, Hwuang, E.*, Thompson, E.W., Schwartz, N., Detre, J.A., Witschey, W.R. and Perdikaris, P., 2022. Feasibility of Vascular Parameter Estimation for Assessing Hypertensive Pregnancy Disorders. Journal of Biomechanical Engineering.

Yang, Y., **Kissas, G.**, Perdikaris, P., 2022. Scalable uncertainty quantification for deep operator networks using randomized priors. Computer Methods in Applied Mechanics and Engineering, 399, p.115399.

Kissas, G.*, Seidman *, J.H., Guilhoto, L.F., Preciado, V.M., Pappas, G.J. and Perdikaris, P., 2022. Learning Operators with Coupled Attention. Journal of Machine Learning Research, 23(215), pp.1-63

Kissas, G., Yang, Y., Hwuang, E., Witschey, W.R., Detre, J.A. and Perdikaris, P., 2020. Machine learning in cardiovascular flows modeling: Predicting arterial blood pressure from non-invasive 4D flow MRI data using physics-informed neural networks. Computer Methods in Applied Mechanics and Engineering, 358, p.112623.(***Featured in the "Most Cited Articles" section of CMAME as one of the most cited papers of the last 3 years.***)

* indicates equal contribution

PATENTS	Learning Operators with Coupled Attention, **G. Kissas**, J. Seidman, G.J. Pappas, P. Perdikaris - Provisional Patent Application 22-9935.
INVITED TALKS	**Kissas, G.**, J. Seidman, P. Perdikaris, G. J. Pappas . NOMAD: Nonlinear Manifold Decoders for Operator Learning, PASC 2022, 27 June, 2022, Basel, Switzerland.
	Kissas, G., **J. Seidman**, L.F. Guilhoto, V. M. Preciado, G. J. Pappas, P. Perdikaris. Learning Operators with Coupled Attention, CRUNCH Group Seminar, Brown University 14 February, 2022, Providence, Rhode Island, USA.
	Kissas, G., **J. Seidman**, L.F. Guilhoto, V. M. Preciado, G. J. Pappas, P. Perdikaris . Learning Operators with Coupled Attention, Andrew Stuart Group, CALTECH, 20 January, 2022, Pasadena, California, USA.
CONFERENCE TALKS	**Kissas, G.**, Seidman , J.H., Guilhoto, L.F., Preciado, V.M., Pappas, G.J. and Perdikaris, P.,Learning Operators with Coupled Attention. Thirty-sixth Conference on Neural Information Processing Systems, (*Journal to Conference track*, **Spotlight Presentation**), November 29-December 7, 2022, New Orleans, USA.
	Kissas, G., Hwuang, E., Schwartz N., Witschey, W.R., Detre, J.A. and Perdikaris, P. 2021. Feasibility of vascular remodeling parameter estimation for assessing hypertensive pregnancy disorders. 16th U.S. National Congress on Computational Mechanics, July 25-29, 2021, Chicago, Illinois, USA.
	Kissas, G., Yang, Y., Hwuang, E., Witschey, W.R., Detre, J.A. and Perdikaris, P. 2019. Machine learning in cardiovascular flows modeling: Predicting pulse wave propagation from non-invasive clinical measurements using physics-informed deep learning. American Physical Society, Division of Fluid Dynamics, Seattle, USA, November, 2019.
	A. Lakkas, A.Sgouros, **G. Kissas**, D. Liveris, G. Megariotis, D. Theodorou. 2017. "Self-Consistent Field Theory for the study of polymer interfaces". 11th Panhellenic Conference of Chemical Engineering, Thessaloniki, Greece.
POSTERS	Seidman, J.H., **Kissas, G.**, Perdikaris, P. and Pappas, G.J., 2022. NOMAD: Nonlinear Manifold Decoders for Operator Learning. Thirty-sixth Conference on Neural Information Processing Systems, November 29-December 7, 2022, New Orleans, USA.
	Kissas, G., Seidman , J.H., Guilhoto, L.F., Preciado, V.M., Pappas, G.J. and Perdikaris, P., Learning Operators with Coupled Attention. Thirty-sixth Conference on Neural Information Processing Systems, *Journal to Conference track*, November 29-December 7, 2022, New Orleans, USA.
	G. Kissas, **E. Hwuang**, W. R. Witschey,P. Perdikaris 2020, Computational estimation of remodeling parameters in Hypertensive Pregnancy Disorders, 2020, Pendergrass Day Perelman School of Medicine, Philadelphia, PA, USA, June 2020
	G. Kissas, E. Hwuang, W. R. Witschey,P. Perdikaris 2020, Computational estimation of remodeling

parameters in Hypertensive Pregnancy Disorders, 2020, VPH2020 Conference, Paris, France, August 2020

Kissas, G., Yang, Y., Hwuang, E., Witschey, W.R., Detre, J.A. and Perdikaris, P. 2019. Machine learning in cardiovascular flows modeling: Predicting pulse wave propagation from non-invasive clinical measurements using physics-informed deep learning. ML-MSM NIH, Bethesda, Maryland, USA, October, 2019.

G. Kissas, Y. Yang, P. Perdikaris, "Learning the Flow Map of Dynamical Systems with Self-Supervised Neural Runge-Kutta Networks", 2019, Learning for Dynamical Systems and Control, Cambridge, MA, May, 2019.

WORKSHOPS 2022 TRIPODS Winter School and Workshop on Interplay between Artificial Intelligence and Dynamical Systems: Paris Perdikaris with Georgios Kissas and Jacob Seidman, Supervised learning in function spaces, Mathematical Institute for Data Science, Johns Hopkins University, 2022. (`https://github.com/PredictiveIntelligenceLab/TRIPODS_Winter_School_2022`)

MINISYMPOSIA "Biophysics-Informed Machine Learning", Organizer/Chair: Georgios Kissas, Co-chair: Jacob Seidman, 2023 Platform for Advanced Scientific Computing (PASC) Conference, Davos, Switzerland, 2023.

ACADEMIC EXPERIENCE
University of Pennsylvania, Philadelphia, Pennsylvania USA
Teaching Assistant
- ENM 360 Introduction to Data-Driven Modelling, Fall 2019-2020.
  Responsible for creating homework assignments, creating exams, teaching, and grading.
- MEAM 536 Viscous Fluid Flows Spring 2021.
  Responsible for recitations, and grading.

ACADEMIC SERVICE Reviewer for Mathematical and Scientific Machine Learning (MSML2020, MSML2021 and MSML2022), Journal of Computational Physics, Computer Methods in Applied Mechanics and Engineering, Nature Communications and Journal of Biomechanical Engineering.

PROFESSIONAL EXPERIENCE
University of Pennsylvania, Philadelphia, PA, USA
Research Assistant   **August, 2018 -**
-Developed methods that combine AI, Computational Mechanics and Fluid Dynamics for precision medicine.
-Worked on projects in areas of Deep Learning for physics simulations and precision medicine, Fluid Dynamics for Cardiovascular Flows, Bayesian Inference, Deep Learning for Dynamical Systems, Sensitivity Analysis and Operator Learning.

Wacker Chemie AG, Burghausen, Munich, Germany
Technische Angestellte   **June, 2018 - August, 2018**
-Developed and enhanced analytical and computational models for modelling solid liquid two-phase flows.
-Created python software for computing the dimensions of fractal nanoparticles and the effective viscosity of suspensions.

Computational Materials Science and Engineering Group, Athens, Greece
Research Assistant   **May, 2016 - May 2018**
- Developed a Finite Element software base on FEAP v8.4 (Finite Element Analysis Program) for the three-dimensional Edward's equation.
- Developed a Spectral Element solver for the system of equations derived from Self-Consistent Field Theory.

Computer Skills
- Computer Languages: Python, Fortran, Bash, C.
- Libraries: Jax, Pytorch, Tensorflow, PyMC3, SALib, PyVTK, SciPy, Matplotlib, Seaborn.
- Applications: Paraview, Vi/Vim, SimVascular, Mathematica.
- Operating Systems: Ubuntu and Arch Linux.

Languages

Greek(native), English (C2), German (B2)

Memberships
- American Physical Society Student Member
- Virtual Physiological Human Institute Student Member
- Wharton Club of Greece