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RESEARCH INTERESTS

Uncertainty Quantification, Dimension Reduction, Engineering Design

EMPLOYMENT

2017 - present: Co-Founder, Extflop LLC
2016 - present: Research Associate, University of Cambridge, U.K.
2013 - 2014: Computational Researcher, Rolls-Royce, Derby, U.K.

DEGREES

2016 Ph.D. in Engineering, University of Cambridge, U.K.
2011 M.S. in Aerospace Engineering, University of Maryland, College Park, U.S.A.
2009 B.S. in Aerospace Engineering, University of Maryland, College Park, U.S.A.

PAPERS IN PROGRESS

1. Seshadri, P., Ghisu, T., Narayan, A., Parks, G. T., (2017) “Four Topics in Polynomial Least Squares: Sampling, Aliasing, Gradients and Memory”, (to be submitted to) *SIAM Journal of Scientific Computing* (June).

PRE-PRINTS

1. Seshadri, P., Shahpar, S., Constantine, P. G., Adams, M., Parks, G. T., (2017) “Turbomachinery Active Subspace Performance Maps”, (under review) *Journal of Turbomachinery*.
2. Seshadri, P., Narayan, A., Mahadevan, S., (2016) “Effectively Subsampled Quadratures for Least Squares Polynomial Approximations”, (under review) *SIAM/ASA Journal of Uncertainty Quantification*.
3. Kalra, T. S., Artexabaleta, A., Seshadri, P., Ganju, N. K., (2017) “Sensitivity Analysis of a Coupled Hydrodynamic-Vegetation Model Using the Effectively Subsampled Quadratures Method”, (under review) *Geophysical Model Development*.

JOURNALS

1. Seshadri, P., Parks, G. T., (2017) “Effective Quadratures (EQ) : Polynomials for Computational Engineering Studies”, *Journal of Open Source Software*, 2(11). DOI: 10.21105/joss.00166

2. Seshadri, P., Constantine, P., Iaccarino, G., Parks, G. (2016) “A Density-Matching Approach for Optimization Under Uncertainty”, *Computer Methods in Applied Mechanics & Engineering*, 305, 562-578. DOI: 10.1016/j.cma.2016.03.006
3. Seshadri, P., Parks, G. T., Shahpar, S., (2015) “Leakage Uncertainties in Compressors: The Case of Rotor 37”, *AIAA Journal of Propulsion & Power*, 31(1), 456-466. DOI: 10.2514/1.B35039
4. Seshadri, P., Benedict, M., Chopra, I., (2013) “Understanding Micro Air Vehicle Flapping-Wing Aerodynamics Using Force and Flowfield Measurements”, *AIAA Journal of Aircraft*, 50(4), 1070-1087. DOI: 10.2514/1.C031968
5. Seshadri, P., Benedict, M., Chopra, I., (2012) “A Novel Mechanism for Emulating Insect Wing Kinematics”, *Bioinspiration & Biomimetics*, 7(3), 1-15. DOI: 10.1088/1748-3182/7/3/036017

OTHERS / REPORTS

1. Seshadri, P., (2017) “Kronecker Product Least Squares”, *arXiv submission*.
2. Seshadri, P., Parks, G. T., Shahpar, S., (2015) “Density-Matching for Turbomachinery Optimization Under Uncertainty”, *arXiv1501.04162v1*.
3. Seshadri, P., (2015) “Aggressive Design and Sparse Surrogates in Turbomachinery Design Optimization”, *PhD Thesis, University of Cambridge*.

CONFERENCES

1. Seshadri, P., Narayan, A., (2017) “Effective Quadratures: Least Squares Polynomial Approximations”, *SIAM Computational Science and Engineering Conference*, Atlanta, Georgia.
2. Seshadri, P., Shahpar, S., Constantine, P. G., Adams, M., Parks, G. T., (2017) “Turbomachinery Active Subspace Performance Maps”, *ASME Turbo Expo*, Charlotte, North Carolina.
3. Bao, Y., Seshadri, P., Mahadevan, S., (2017) “Motion Magnification for Quantifying Aeroelastic Modes from High-Speed Videos”, *58th AIAA Structures, Structural Dynamics, and Materials Conference*, Grapevine, Texas. (DOI: 10.2514/6.2017-0869)

TEACHING (University of Cambridge)

- 3M1 Mathematical Methods (Linear Algebra, Constrained Optimization, Markov Chains): Supervisor (Spring 2017)
- 1P7 Linear Algebra: Supervisor (Spring 2017)
- Thermofluids: Supervisor (Fall 2016)

- Structural Mechanics: Supervisor (Fall 2014)

SOFTWARE (Lead developer)

1. *Effective Quadratures: Polynomials for Data Analytics*
An open-source suite of tools for generating polynomials for facilitating uncertainty quantification studies, sensitivity analysis and regression.
www.effective-quadratures.org
2. *Rolls-Royce Performance Analysis Uncertainty Tool (PLUTO)*
Rolls-Royce internal code for whole engine uncertainty assessment for engines and rigs.
Coded in Pyside (Python QT libraries).

FUNDING

1. *Rolls-Royce plc.: Dimension reduction for investigating turbine capacity (Summer student research project)*
Funder contribution: 3,800 GBP.
Dates: July 2017 – September 2017.
PI: Geoffrey Parks, Co-Investigator: Pranay Seshadri.
2. *Rolls-Royce plc.: Improved Engine Uncertainty Assessment Tool*
Funder contribution: 85,761 GBP.
Dates: November 2016 – October 2017.
PI: Geoffrey Parks, Co-Investigator: Pranay Seshadri.
3. *EPSRC: Knowledge Transfer Fellowship (Internal)*
Funder contribution: 33,455 GBP.
Dates: February 2016 – November 2016.
PI: Geoffrey Parks, Co-Investigator: Pranay Seshadri.
4. *Rolls-Royce plc.: Polynomial Chaos Uncertainty Quantification Methods*
Funder contribution: 5,000 GBP.
Dates: February 2014 – May 2014.
PI: Geoffrey Parks, Co-Investigator: Pranay Seshadri.