Dongyang Kuang

Curriculum Vitae

Live in the moment. Learn from the past. Dream for the future.

PERSONAL INFO

Gender	Male
Citizenship	Chinese
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Github	https://github.com/dykuang
LinkedIn	https://www.linkedin.com/in/dykuang

WORK EXPERIENCE

Postdoc Fellow Aug. 2019 - Present

Oden Institute for Computational Engineering & Sciences, University of Texas - Austin

Postdoc Fellow Sep. 2017 - Jul. 2019

Dept. of Mathematics & Statistics, University of Ottawa

Data Science and Machine Learning Group

Responsibilities: Fusing theoretical power of classical theories and computational power from machine learning/deep learning together to develop useful tools in fields where traditional methods are usually dominant. Current projects include medical image registration and universal embedding of nonlinear dynamics.

Visiting Assistant Professor Aug. 2016 - Jun. 2017

Dept. of Mathematics, Southern Utah University

Responsibilities: Teaching math courses and conducting interdisciplinary research.

Graduate Assistant Jan. 2012 - May. 2016

Dept. of Mathematics, University of Wyoming

Responsibilities: Teaching math courses and tutoring in math assistant center.

EDUCATION

PhD. Applied Mathematics 2012-2016

University of Wyoming, Laramie, Wyoming

- GPA: 3.956/4.00
- Dissertation: **A Particle Method for Euler-Poincaré Equation and Its Applications in Analysis of Landmark Based Image Templates.**
- Advisor: *Prof. Long Lee.* Dept. of Mathematics. Univ. of Wyoming.

B.S. Applied Mathematics 2007-2011
University of Science and Technology of China, Hefei, Anhui, China

- GPA: 3.50/4.30
- Ranking: 29/100
- Thesis: **Numerical Integration of Two Variables Based on Small Amounts of Sample Points.**
- Advisor: *Prof. Jiansong Deng.* Dept. of Mathematics. Univ. of Sci. & Tech. of China.

PAPERS IN SUBMISSION

- **Cycle-consistent training for Reducing Negative Jacobian Determinant in Deep Registration Networks**.
  Dongyang Kuang
  https://arxiv.org/abs/1907.00068

- **FAIM – A ConvNet Method for Unsupervised 3D Medical Image Registration.**
  Dongyang Kuang and Tanya Schmah
  https://arxiv.org/abs/1811.09243

- **A 1d convolutional network for leaf and time series classification**
  Dongyang Kuang
  https://github.com/dykuang/dykuang.github.io/blob/master/Files/leaf.pdf

PUBLICATIONS

- **Landmark-based algorithms for group average and pattern recognition.**
  Snehalata Huzurbazar, Dongyang Kuang and Long Lee
  Pattern Recognition
  Volume 86, pp 172-187.

- **Predicting kinetic triplets using a 1d convolutional neural network.**
  Dongyang Kuang and Bang Xu
  Thermochimica Acta
  Volume 669, pp 8-15.

- **A geodesic landmark shooting algorithm for template matching and its applications.**
  Roberto Camassa, Dongyang Kuang and Long Lee
  SIAM Journal on Imaging Sciences.
  Volume 10, Issue 1, pp 303-334.

- **Solitary waves and N-particle algorithms for a class of Euler-Poincaré equations.**
  Roberto Camassa, Dongyang Kuang and Long Lee
  Study in Applied Mathematics.
  Volume 137, Issue 4. pp 502–546.

- **A conservative formulation and a numerical algorithm for the double-gyre nonlinear shallow-water model.**
  Dongyang Kuang and Long Lee
  Numerical Mathematics: Theory, Methods and Applications.
  Volume 8. Issue. 4. pp 634-650.

- **Some optional methods of activation energy determination on pyrolysis**
  Bang Xu and Dongyang Kuang
  Kinet. Catal.
  Volume 60. No. 2.

- **Characterization of Powder River Basin coal pyrolysis with cost-effective and environmentally friendly composite Na-Fe catalysts in a thermo-gravimetric analyzer and a fixed-bed reactor**
  Bang Xu, Dongyang Kuang, Fangjing Liu, Wenyang Lu, Alexander K.Goroncyc, Ting He, Khaled Gasem and Maohong Fan
  International Journal of Hydrogen Energy.
  Volume 43, Issue 14, pp 6918-6935

SKILLS & INTERESTS

Programming:

- Most experienced: MATLAB, PYTHON
- Moderate experienced: C, C++, R, MATHEMATICA
- Least experienced: SQL, Shell

Languages:

- Chinese (Mandarin)
- English

Areas of Interests:

- Artificial Intelligence, Deep Learning, Machine Learning, Mathematical Modeling, Scientific Computing, Data Analysis

Hobbies:

- Travel, Hiking, Badminton, Table Tennis.

ACADEMIC PROJECTS

- **Several Projects in Pattern Classification** Sep. 2015 - Dec. 2015
  Advisor: *Prof. Cameron Wright.*
  Dept. of Electrical Engineering. Univ. of Wyoming

- **Bootstrap Sampling in Brief** Jan. 2015 - April 2015
  Advisor: *Prof. Blair Robertson.*
  Dept. of Statistics. Univ. of Wyoming

- **Simulation of Itô Stochastic Equations** Sep. 2014 - Dec. 2014
  Advisor: *Prof. Hakima Bessaih.*
  Dept. of Mathematics. Univ. of Wyoming

- **Numerical Solvers for Parabolic PDEs** Sep. 2014 - Dec. 2014
  Other Team Member: *Evan Anderson*
  Advisor: *Prof. Craig. C. Douglas.*
  Dept. of Mathematics, Univ.of Wyoming

- **Data Investigation for the Historical University Registration Data** Jan 2014 - May 2014
  Other Team Member: *TianZhixi Yin & Damian Stansbury*
  Advisor: *Prof. Craig. C. Douglas.*
  Dept. of Mathematics, Univ.of Wyoming

- **NURBS Time Series Research Model and Reconstruction of Missing Data** Jun. 2010 - Sep. 2010
  Other Team Member: *Lipeng Xiao*
  Advisor: *Prof. Chengxi Shao.*
  School of Computer Science and Technology, Univ. of Sci. & Tech. of China

- **Behavior Analysis of Mobile Phone Users** Feb. 2010 - Jun. 2010
  Other Team Member: *Wei Wang & Sixin Wu*
  Advisor: *Prof. Zhouwang Yang.*
  Dept. of Mathematics, Univ. of Sci. & Tech. of China

SEMINARS & TALKS

⋆ *indicates invited talks.*

- **Convnets, a different view of approximating diffeomorphisms in medical image registration** Dec 2018
  Shape Analysis, Stochastic Geometric Mechanics and Applied Optimal Transport Workshop, Banff International Research Station, Banff, Alberta

- **Improve Effectiveness of Spectral Matching in Portable Raman Spectrometers** May 2018
  NRC-Ottawa Industrial Problem Solving Workshop, NRC, Ottawa

- ⋆ **Medical image registration with neural networks** Apr 2018
  Statistical Learning Workshop, Univ. of Ottawa, Ottawa

- **2B or not 2B? – It is a mathematical question.** Feb 2017
  Chatham University, Pittsburgh, PA

- ⋆ **A Bayesian method on landmark momentum data for abnormality detection**
  RMMC-Functional Analytic and Statistical Methods in Error Prediction with Applications. Univ. of Wyoming, Laramie WY. Jun 2016
  Southern Utah University, Cedar City, Utah Oct 2016

- **Shape analysis based on landmark representation** May 2015
  Applied and Computational Mathematics Seminars, Univ. of Wyoming, Laramie WY

- **The N-particle system for EPDiff and its applications in shape analysis** Mar 2015
  Graduate Students Seminars, Univ. of Wyoming, Laramie WY

CONFERENCES & WORKSHOPS

- Shape Analysis, Stochastic Geometric Mechanics and Applied Optimal Transport. Dec 2018
  Banff International Research Station, Alberta, Canada
- 32nd Conference on Neural Information Processing Systems (NeurIPS) Dec 2018
  Montreal, Quebec, Canada
- NRC-Ottawa Industrial Problem Solving Workshop. May 2018
  Fields Institute - Canada National Research Council - University of Ottawa
- Geometric PDEs and Their Approximation. Jan 2016
  Texas A&M Univ.
- Rocky Mountain Mathematics Consortium (RMMC)
  - *Functional Analytic and Statistical Methods in Error Prediction with Applications.* Jun 2016
  Univ. of Wyoming
- Rocky Mountain Mathematics Consortium (RMMC)
  - *Stochastic Differential Equations.* Jun 2014
  Univ. of Wyoming

HONORS & AWARDS

- March. 2019: Affiliation Award with Vector Institute for Artificial Intelligence. [1]
- Nov. 2015: Travel award for winter school
  "Geometric PDEs and Their Approximation" in TAMU. January 10-15, 2016
- 2012-2016: Graduate assistantship, Univ. of Wyoming
- 2010-2011:
  - National endeavor fellowship (Grade 1)
  - Tier I prize on the undergraduate research project
  - Tang Zhongyin scholarship
  - USTC outstanding student scholarship (Grade 3)
- 2009-2010:
  - National endeavor fellowship (Grade 1)
  - USTC outstanding student scholarship (Grade 3)
- 2008-2009: USTC outstanding student scholarship (Grade 3)

[1] Did not accept it due to change of job leaving Ontario

NON-ACADEMIC EXPERIENCE

- 2018: Volunteer of "*The Data Effect*" conference in Ottawa.
- 2016: Volunteer of CSSA (Chinese Students and Scholar Association).
- 2015: Participation in Pikes Peak badminton tounarment in Colorado.
- 2015-2016: Officer of university badminton club.
- 2010: Volunteer of USTC freshmen reception.
- 2008-2010: Student member of the class scholarship committee.