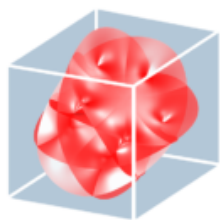


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Geometric Analysis Approach to AI Workshop

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Geometric Analysis Approach to AI



On **January 18-21, 2019** the Center of Mathematical Sciences and Applications will be hosting a workshop on the Geometric Analysis Approach to AI.

This workshop will focus on the theoretic foundations of AI, especially various methods in Deep Learning. The topics will cover the relationship between deep learning and optimal transportation theory, DL and information geometry, DL Learning and information bottle neck and renormalization theory, DL and manifold embedding and so on. Furthermore, the recent advancements, novel methods, and real world applications of Deep Learning will also be reported and discussed.

The workshop will take place from January 18th to January 23rd, 2019. In the first four days, from January 18th to January 21, the speakers will give short courses; On the 22nd and 23rd, the speakers will give conference representations. This workshop is organized by Xianfeng Gu (<http://www3.cs.stonybrook.edu/~gu/>) and Shing-Tung Yau (<http://www.doctoryau.com/>).

The workshop will be held in **room G10 of the CMSA, located at 20 Garden Street, Cambridge, MA** (<http://cmsa.fas.harvard.edu/about/contact-directions/>).

For a list of lodging options convenient to the Center, please visit our recommended lodgings page (<http://cmsa.fas.harvard.edu/recommended-lodging/>).

Please register here

(https://docs.google.com/forms/d/e/1FAIpQLSfs1KC7hd9O88sJs1coZLrD3QPO4ndwUrpQNGMpDBNqVBda5g/viewform?usp=sf_link)

Speakers:

- » Sarah Adel Bargal (<http://cs-people.bu.edu/sbargal/>), Boston University
- » Guy Bresler (<http://www.mit.edu/~gbresler/>), MIT
- » Tina Eliassi-Rad (<http://eliassi.org/>), Northeastern
- » Yun Raymond Fu (<http://www1.ece.neu.edu/~yunfu/>), Northeastern
- » Brian Kulis (<http://people.bu.edu/bkulis/>), Boston University
- » Yi Ma (<https://www2.eecs.berkeley.edu/Faculty/Homepages/yima.html>), UC Berkeley
- » Minh Hoai Nguyen (<https://www3.cs.stonybrook.edu/~minhhoai/index.html>), Stony Brook
- » Francesco Orabona (<http://francesco.orabona.com/>), Boston University
- » Cengiz Pehlevan (<https://pehlevan.seas.harvard.edu/>), Harvard SEAS
- » Tomaso Poggio (<https://mcgovern.mit.edu/principal-investigators/tomaso-poggio>), MIT
- » Zhiwei Qin (<https://sites.google.com/site/tonyqin/>), DiDi Research America
- » Kate Saenko (<https://www.bu.edu/cs/profiles/kate-saenko/>), Boston University
- » Dimitris Samaras (<https://www.cs.stonybrook.edu/people/faculty/DimitrisSamaras>), Stony Brook
- » Johannes Schmidt-Hieber (<http://pub.math.leidenuniv.nl/~schmidthieberaj/>), University of Twente
- » Steven Skiena (<https://www3.cs.stonybrook.edu/~skiena/>), Stony Brook
- » Vivienne Sze (<http://www.rle.mit.edu/people/directory/vivienne-sze/>), MIT
- » Naftali Tishby (<http://naftali-tishby.strikingly.com/>), ICNC
- » Jiajun Wu (<https://jiajunwu.com/>), MIT
- » Ying Nian Wu (<http://www.stat.ucla.edu/~ywu/me.html>), UCLA
- » Gangqiang Xia, Morgan Stanley
- » Eric Xing (<http://www.cs.cmu.edu/~epxing/>), Carnegie Mellon
- » Donghui Yan (<http://www.math.umassd.edu/~dyan/>), UMass Dartmouth
- » Alan Yuille (<http://www.cs.jhu.edu/~ayuille/>), Johns Hopkins
- » Juhua Zhu (<https://www.linkedin.com/in/juhua-zhu-8001317>), Argus

Schedule:

Friday, Jan. 18			
TIME	SPEAKER	INSTITUTION	TALK TITLE
8:30-9:00	Breakfast		
9:00-10:00	Eric Xing	Carnegie Mellon University	
10:00-11:00am	Jiajun Wu	Massachusetts Institute of Technology	Physical Scene Understanding with Compositional Structure
11:00-11:30am	Coffee		
11:30-12:30pm	Tomaso Poggio	Massachusetts Institute of Technology	Three puzzles in the theory of Deep Learning

12:30- 2:00pm	Lunch		
2:00-3:00pm	Vivienne Sze	Massachusetts Institute of Technology	Enabling Efficient Processing of Deep Neural Networks
3:00-4:00pm	Xianfeng David Gu	Stony Brook University	GAN, Optimal Transport and Monge-Ampere Equation
4:00-4:30pm	Coffee		

Saturday, Jan. 19

TIME	SPEAKER	INSTITUTION	TALK TITLE
8:30-9:00am	Breakfast		
9:00-10:00am	Johannes Schmidt-Hieber	University of Twente	From network sparsity to statistical guarantees
10:00-11:00am	Steven Skiena	Stony Brook University	
11:00-11:30am	Coffee		
11:30-12:30pm	Guy Bresler	Massachusetts Institute of Technology	Reducibility and Computational Lower Bounds for some High-Dimensional Statistics Problems
12:30-2:00pm	Lunch		
2:00-3:00pm	Yingnian Wu	UCLA	A representational theory of grid cells
3:00-4:00pm	Francesco Orabona	Boston University	Parameter-free Machine Learning through Coin Betting
4:00-4:30pm	Coffee		
4:30-5:30pm	Tina Eliassi-Rad	Northeastern University	Graph Distance from the Topological View of Non-backtracking Cycles

Sunday, Jan. 20

TIME	SPEAKER	INSTITUTION	TALK TITLE
8:30-9:00am	Breakfast		
9:00-10:00am	Cengiz Pehlevan	Harvard	A similarity-based normative theory of biologically-plausible learning in neural networks

10:00-11:00am	Brian Kulis	Boston University	Small-Variance Asymptotics for Large-Scale Learning
11:00-11:30am	Coffee		
11:30-12:30pm	Minh Hoai Nguyen	Stony Brook University	
12:30-2:00pm	Lunch		
2:00-3:00pm	Zhiwei (Tony) Qin	DiDi Research America	Reinforcement Learning with Applications in Ridesharing and Transportation
3:00-4:00pm	Gangqiang Xia	Morgan Stanley	Alternative Data and Machine Learning in Fixed Income Modeling
4:00-4:30pm	Coffee		
4:30-5:30pm	Zhu, Juhua	Argus Investment Management	The Application of Machine Learning in Quantitative Trading

Monday, Jan. 21

TIME	SPEAKER	INSTITUTION	TALK TITLE
8:30-9:00am	Breakfast		
9:00-10:00am	Kate Saenko	Boston University	Adaptive Deep Learning for Visual Understanding
10:00-11:00am	Yi Ma	University of California, Berkeley	
11:00-11:30am	Coffee		
11:30-12:30pm	Sarah Adel Bargal	Boston University	Grounding Deep Models of Visual Data
12:30-2:00pm	Lunch		
2:00-3:00pm	Alan Yuille	Johns Hopkins University	
3:00-4:00pm	Donghui Yan	UMass Dartmouth	Random projection forests
4:00-4:30pm	Coffee		
4:30-5:30pm	Yun Raymond Fu	Northeastern University	

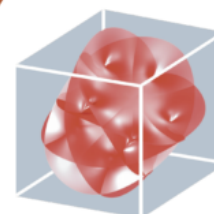
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Brian Kulis, Boston University
Yi Ma, UC Berkeley
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Francesco Orabona, Boston University
Cengiz Pehlevan, Harvard SEAS
Tomaso Poggio, MIT
Zhiwei Qin, DiDi Research America
Kate Saenko, Boston University
Dimitris Samaras, Stony Brook
Johannes Schmidt-Hieber, University of Twente

Steven Skiena, Stony Brook
Divienne Sze, MIT
Naftali Tishby, ICNC
Jiajun Wu, MIT
Ying Nian Wu, UCLA
Gangqiang Xia, Morgan Stanley
Eric Xing, Carnegie Mellon
Donghui Yan, UMass Dartmouth
Alan Yuille, Johns Hopkins
Juhua Zhu, Argus

This workshop is organized by
Xianfeng Gu and Shing-Tung Yau

Geometric Analysis Approach to AI



January 18–21, 2019

Room G10 of the CMSA, 20 Garden Street, Cambridge, MA

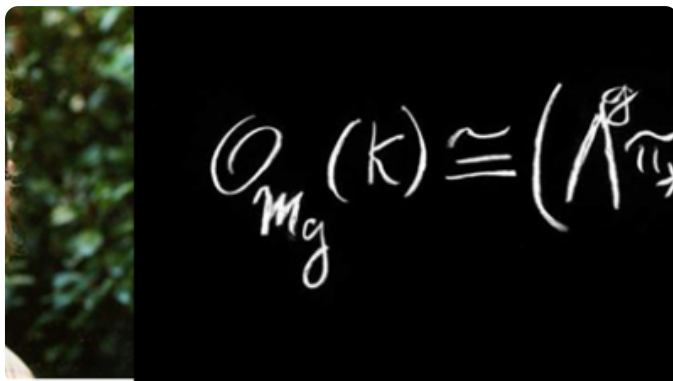
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AGENDA

Today	Wednesday, January 16	
Look for earlier events		
Wednesday, January 16		
1:30pm	Hodge and Noether-Lefschetz lc	
Friday, January 18		
Geometric Analysis Approach to AI		
Saturday, January 19		
Geometric Analysis Approach to AI		
Sunday, January 20		
Geometric Analysis Approach to AI		
Monday, January 21		
Geometric Analysis Approach to AI		
Tuesday, January 22		
12:00pm	HMS Group Meeting	
Wednesday, January 23		
1:30pm	Hodge and Noether-Lefschetz lc	
Thursday, January 24		
Blockchain Conference		
Friday, January 25		
Blockchain Conference		
Monday, January 28		
10:00am	Topology Weekly Seminar	

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The first Hodge and Noether-Lefschetz Loci Seminar of the Spring semester is today!

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HODGE AND NOETHER-LEFSCHETZ
LOCI SEMINAR

Hossein Movasati
IMPA

will speak on:
Algebraic BCOV anomaly equation

Wednesday, January 16, 2019
1:30 – 3:00 pm
CMSA Building, 20 Garden St, G10

We introduce the moduli space T of non-rigid compact Calabi-Yau threefolds enhanced with differential forms and a Lie algebra of vector fields in T . This will be used in order to give a purely algebraic interpretation of the moduli space.

13h

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- » New Publications by Juven Wang (<http://cmsablog.fas.harvard.edu/2019/01/new-publications-by-juven-wang/>)
- » Existence and Uniqueness of Near-Horizon Geometries for 5-Dimensional Black Holes (<http://cmsablog.fas.harvard.edu/2019/01/existence-and-uniqueness-of-near-horizon-geometries-for-5-dimensional-black-holes/>)
- » Modeling Multivariate Time Series in Economics: From Auto-Regressions to Recurrent Neural Networks (<http://cmsablog.fas.harvard.edu/2019/01/modeling-multivariate-time-series-in-economics-from-auto-regressions-to-recurrent-neural-networks/>)
- » Videos of the Workshop on Morphogenesis: Geometry and Physics (<http://cmsablog.fas.harvard.edu/2018/12/videos-of-the-workshop-on-morphogenesis-geometry-and-physics/>)
- » Hodge and Noether-Lefschetz Loci with Hossein Movasati (<http://cmsablog.fas.harvard.edu/2018/12/hodge-and-noether-lefschetz-loci-with-hossein-movasati/>)
- » Postdoctoral Fellowship in Mathematical Finance (<http://cmsablog.fas.harvard.edu/2018/12/postdoctoral-fellowship-in-mathematical-finance/>)
- » Photos from the Workshop on Morphogenesis: Geometry and Physics (<http://cmsablog.fas.harvard.edu/2018/12/photos-from-the-workshop-on-morphogenesis-geometry-and-physics/>)
- » Ravi Jagadeesan is a Recipient of the 2019 Morgan Prize (<http://cmsablog.fas.harvard.edu/2018/12/ravi-jagadeesan-2019-morgan-prize/>)
- » 2018 Ding Shum Lecture: Eric Maskin (<http://cmsablog.fas.harvard.edu/2018/12/2018-ding-shum-lecture-eric-maskin/>)

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