CONFERENCE PROGRAM

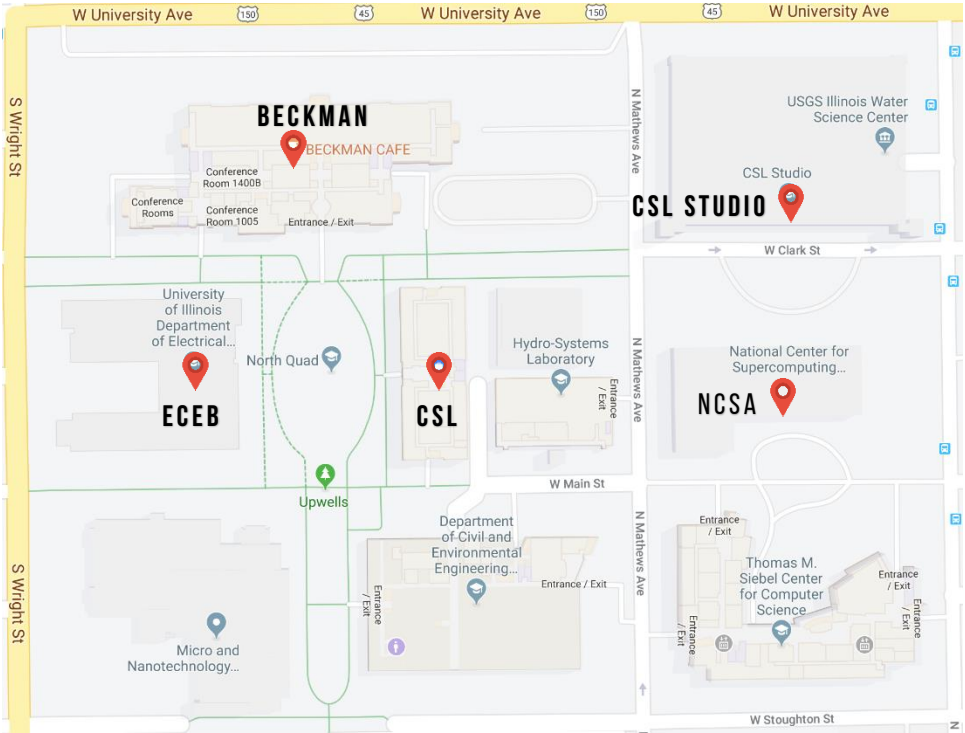# 15TH ANNUAL CSL STUDENT CONFERENCE
FEBRUARY 26-28, 2020

CO-HOSTED BY:

MAP OF CONFERENCE LOCATIONS

SCHEDULE – AT A GLANCE

TIME	WEDNESDAY, 26TH FEB 2020	THURSDAY, 27TH FEB 2020	FRIDAY, 28TH FEB 2020
8:00 AM - 8:30 AM		BREAKFAST AND REGISTRATION, CSL LOBBY	
8:30 AM - 9:00 AM			
9:00 AM - 9:30 AM	MICROSOFT WORKSHOP 9:00 AM -11:00 AM CSL 301 / INTEL WORKSHOP 9:00 AM -11:00 AM CSL 141	SESSION 1 HEALTH INFORMATICS AND COMPUTATIONAL BIOLOGY 9:00 AM - 12:00 PM, CSL B02	SESSION 3 HIGH PERFORMANCE COMPUTING 9:00 AM - 12:00 PM, CSL B02
9:30 AM - 10:00			
10:00 AM - 10:30			
10:30 AM - 11:00			
11:00 AM - 11:30	VAIL WORKSHOP 11:00 AM - 1:00 PM CSL 301 / NVIDIA WORKSHOP 11:00 AM - 1:00 PM CSL 141		
11:30 AM - 12:00			
12:00 PM - 12:30		POSTER SESSION 12:00 PM - 2:00 PM, ECEB 3002	ROBOTICS DEMONSTRATIONS 12:00 PM - 2:00 PM, CSL STUDIO
12:30 PM - 1:00 PM			
1:00 PM - 1:30 PM	COMM WORKSHOP, 1:15 PM - 2:30 PM, CSL 301		
1:30 PM - 2:00 PM			
2:00 PM - 2:30 PM		SESSION 2 MACHINE LEARNING AND SIGNAL PROCESSING 2:00 PM - 5:00 PM, CSL B02	SESSION 4 DECISION, CONTROL AND OPTIMIZATION 2:00 PM - 5:00 PM, CSL B02
2:30 PM - 3:00 PM	GRADUATE STUDENT JOB FAIR 2:00 PM - 5:00 PM, ECEB 3002		
3:00 PM - 3:30 PM			
3:30 PM - 4:00 PM			
4:00 PM - 4:30 PM			
4:30 PM - 5:00 PM			
5:00 PM - 5:30 PM	PLENARY TALK BY EYAL OFEK, MICROSOFT 5:00 PM - 6:30 PM, NCSA AUDITORIUM	PANEL DISCUSSION, 5:00 PM - 6:00 PM, CSL B02	MENTORING CIRCLES, 5 - 6 PM, BECKMAN ATRIUM
5:30 PM - 6:00 PM			
6:00 PM - 6:30 PM			
6:30 PM - 7:00 PM	OPENING RECEPTION 6:30 PM - 8:30 PM NCSA FOYER	SPECIAL DINNER (INVITATION ONLY) 6:30 PM - 8:30 PM	AWARDS RECEPTION 6:30 PM - 8:00 PM, BECKMAN ATRIUM
7:00 PM - 7:30 PM			
7:30 PM - 8:00 PM		VAIL FREECLIMB HACKATHON 6:00 PM - 9:30 PM ECEB 3002	
8:00 PM - 8:30 PM			
8:30 PM - 9:00 PM			
9:00 PM - 9:30 PM			

DAY 1: WEDNESDAY, 26TH FEB 2020

TIME	EVENT	LOCATION
8:00 AM — 9:00 AM	**BREAKFAST & REGISTRATION**	**CSL LOBBY**
9:00 AM — 11:00 AM	**MICROSOFT WORKSHOP**	**CSL 301**
9:00 AM — 11:00 AM	**INTEL WORKSHOP**	**CSL 141**
11:00 AM — 1:00 PM	**VAIL WORKSHOP**	**CSL 301**
11:00 AM — 1:00 PM	**NVIDIA WORKSHOP**	**CSL 141**
1:15 PM — 2:30 PM	**COMMUNICATIONS WORKSHOP**	**CSL 301**
2:00 PM — 5:00 PM	**GRADUATE STUDENT JOB FAIR**	**ECEB 3002**
5:00 PM — 5:15 PM	**WELCOME ADDRESS: KLARA NAHRSTEDT, CSL DIRECTOR**	**NCSA AUDITORIUM**
5:15 PM — 6:30 PM	**PLENARY TALK: EYAL OFEK, MICROSOFT RESEARCH**	**NCSA AUDITORIUM**
6:30 PM — 8:30 PM	**WELCOME RECEPTION**	**NCSA FOYER**

DAY 2: THURSDAY, 27TH FEB 2020

TIME	EVENT	LOCATION
8:00 AM – 9:00 AM	BREAKFAST & REGISTRATION	CSL LOBBY
9:00 AM – 12:00 PM	SESSION 1: HEALTH INFORMATICS AND COMPUTATIONAL BIOLOGY (SPONSORED BY ABBVIE)	CSL B02 abbvie
12:00 PM – 2:00 PM	POSTER SESSION	ECEB 3002
2:00 PM – 5:00 PM	SESSION 2: MACHINE LEARNING AND SIGNAL PROCESSING (SPONSORED BY VAIL SYSTEMS)	CSL B02 VAIL
5:00 PM – 6:00 PM	PANEL DISCUSSION: "IMPACT OF AI: WHAT TO EXPECT IN THE NEXT DECADE"	CSL B02
6:00 PM – 9:30 PM	VAIL HACKATHON	ECEB 3002 VAIL
6:30 PM – 8:30 PM	INVITED DINNER	-

DAY 3: FRIDAY, 28TH FEB 2020

TIME	EVENT	LOCATION
8:00 AM – 9:00 AM	BREAKFAST & REGISTRATION	CSL LOBBY
9:00 AM – 12:00 PM	SESSION 3: HIGH PERFORMANCE COMPUTING (SPONSORED BY NVIDIA)	CSL B02
12:00 PM – 2:00 PM	ROBOTICS DEMONSTRATIONS	CSL STUDIO
2:00 PM – 5:00 PM	SESSION 4: DECISION, CONTROL AND OPTIMIZATION	CSL B02
5:00 PM – 6:00 PM	MENTORING CIRCLES	BECKMAN ATRIUM
6:30 PM – 6:45 PM	CLOSING ADDRESS: BRUCE HAJEK ECE DEPARTMENT HEAD	BECKMAN ATRIUM
6:30 PM – 8:00 PM	AWARDS RECEPTION	BECKMAN ATRIUM

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ACKNOWLEDGMENT

COMPANY WORKSHOPS

MICROSOFT · · · · · · · · FEB 26, 9 AM – 11 AM, CSL 301

Automatic Speech Transcription and Translation in the Classroom and Lecture Setting: The Technologies, How They're Being Used, and Where We're Going

Presenter: William Lewis, Microsoft Translator

Abstract:
We have witnessed significant progress in Automated Speech Recognition (ASR) and Machine Translation (MT) in recent years, so much so that Speech Translation, itself a combination of these underlying technologies, is becoming a viable technology in its own right. Although not perfect, many have called what they've seen of the current technology the "Universal Translator" or the "mini-UN on a phone". But we're not done and there are many problems to solve. People are amazingly disfluent, which can have profound negative impacts on transcripts and translations. We need to make the output of ASR more "fluent"; this has the effect of improving the quality of downstream translations. Further, since "fluent" output is much more readable and "caption-like" than disfluent, it is also more easily consumable by same-language users. Speech Translation is currently being used in a variety of scenarios, no more so than in education. It sees its greatest uptake in settings where one or more speakers needs to communicate with a multilingual population. Perfect examples are the classroom, but we also see its use in parent-teacher conferences. The underlying technologies can be enhanced further by giving users some control over customizing the underlying models, e.g., to domain-specific vocabulary or speaker accents, significantly improving user experiences. In this talk we will demonstrate the technology in action as part of the presentation.

INTEL   FEB 26, 9 AM – 11 AM, CSL 141

Using Intel oneAPI to program heterogeneous CPU, GPU, and/or FPGA parallel systems

Presenter: Ellick Chan

Abstract:
oneAPI is a single, unified programming model that aims to simplify development across multiple architectures – such as CPUs, GPUs, FPGAs and other accelerators. This workshop helps you get started with learning how to program with the Data Parallel C++ (DPC++) language and oneAPI cross-architecture libraries.

VAIL   FEB 26, 11 AM – 1 PM, CSL 301

Communication: The human connection

Presenters: Joe Smetana, Vijay K. Gurbani, Jordan Hosier, Yu Zhou

The human voice is capable of conveying nuances and meaning that can't just be expressed through clicks and chat messages. For this reason, voice interactions have always had a special power to shape our perceptions and experiences. At Vail, we believe in the unique power of voice interactions to create more expressive and efficient interpersonal interactions. From basic network services, to state-of-the art IP communications, to cutting edge real-time analytics, to innovative fraud detection models, Vail technology makes millions of voice interactions better every day.

In this workshop we provide an introduction to Vail Systems and highlight some of the work we are doing at Vail that occurs at the intersection of communications and affective computing:

1. Conversational AI agent as an aid for large-scale IoT devices embedded in buildings.
2. Identifying and resolving mis-transcriptions that arise from phonetic ambiguity and degraded acoustic signals.
3. Sentiment Analysis of Acoustic Features with Neural Networks.

Talk 1: What's New in the CUDA Math Libraries

Presenter: Harun Bayrakhtar (Senior Manager, CUDA Mathematical Software Libraries)

Abstract:

Today's fastest compute platforms are designed from the ground up to leverage the immense compute power of NVIDIA GPUs. As these platforms increase in scale and add specialized hardware, the CUDA Math Libraries are keeping up by constantly expanding, providing industry leading performance and coverage of common compute workflows across AI, ML, and HPC. Major initiatives to support common workflows are: multi-GPU scalability, reduced and mixed precision computing, and libraries that allow kernel fusion and customizations. In this talk, we review the latest developments in the CUDA Math Libraries including Tensor Core acceleration of HPC solvers without loss of accuracy, support for multiple GPUs in FFTs, BLAS and LAPACK routines, and the addition of new libraries with device function support and tensor linear algebra functionality.

Talk 2: Accelerating Apache Spark ETL Workflows with Nvidia GPUs

Presenter: Kuhu Shukla (Senior Distributed System Engineer)

Abstract:

Apache Spark is a unified analytics engine for big data processing with built-in modules for streaming, SQL, machine learning, and graph processing. It's used extensively in ETL and machine learning workloads across the big data community. GPUs are a quintessential choice for running machine learning and AI workloads. As part of our ongoing effort at NVIDIA, we present a glimpse into what goes into combining these two worlds to accelerate production scale Apache Spark ETL workloads with NVIDIA GPUs. In this talk, we'll explore some of the assumptions and challenges that need to be considered when developing software around GPUs and dive into how GPU accelerated Spark SQL queries work.

Talk 3: Mixed Precision Numerical Techniques Accelerated with Tensor Cores and its Impact on Today's Scientific Computing and Implications for Tomorrow's Hardware Design

Presenter: Azzam Haidar (Senior CUDA Mathematical Libraries Engineer)

Abstract:

Double-precision-floating-point has been the-de-facto standard for doing scientific simulation for several decades. Problem complexity and the sheer magnitude of data coming from various instruments and sensors motivate researchers to mix and match various approaches to optimize compute resources, including different levels of floating-point precision. In recent years, the big bang for machine learning has focused significant attention on half-precision.

We explored the possibility of using FP16/FP32-Tensor-Cores on NVIDIA-Volta-GPUs to accelerate one of the most common linear algebra routines without loss of accuracy. We achieved a 4x performance increase and 5x better energy efficiency versus the standard FP64 implementation while providing a solution with FP64 accuracy.

We studied a plasma fusion application that simulates the instabilities that occur inside a plasma inside the International-Thermonuclear-Experimental-Reactor (ITER). We show that using our mixed precision solver that harnesses the FP16/FP32-Tensor-cores in Volta GPUs, it is possible to simulate the instability between plasma beams 3.5x faster.

INTERACTIVE SESSIONS

COMMUNICATIONS WORKSHOP   FEB 26, 1:15 – 2:30 PM
CSL 301

Want to effectively communicate your research online and on social media? Learn from the ECE and CSL communications teams.

PANEL DISCUSSION   FEB 27, 5 – 6 PM, CSL B02
"IMPACT OF AI, WHAT TO EXPECT IN THE NEXT DECADE"

Join a group of experts as they debate and discuss the impacts of AI in the coming decade. Questions from audience welcome! Panel moderated by CSL Director Prof Klara Nahrstedt. Panelists are UIUC Profs. Ravi Iyer, Alex Schwing, Bo Li, Saurabh Gupta, and Dr. Ellick Chan from Intel.

VAIL HACKATHON   FEB 27, 6 – 9:30 PM, ECEB 3002

Code. Food. Prizes. Be There. The Hackathon will leverage FreeClimb, the Vail communication API. For more details, checkout our webpage.

MENTORING CIRCLES   FEB 28, 5 – 6 PM
BECKMAN ATRIUM

Seek personalized advice regarding career or academic endeavours. Mentors lead discussions in small groups. Participants switch groups every 15 min. We will cover topics of industry vs academic research, women in STEM to planning a PhD and academic work-life balance!

THE FULL LIST OF TABLES AND MENTORS WILL BE AVAILABLE ON THE MORNING OF FEB 28TH AT THE REGISTRATION DESK.

GRADUATE STUDENT JOB FAIR

FEB 26, 2PM - 5PM, ECEB 3002

.. and more!

PLENARY TALK: VIRTUAL REALITY IN THE WILD
DR. EYAL OFEK
PRINCIPAL RESEARCHER
MICROSOFT RESEARCH

FEB 26, 5:00 PM – 6:30 PM, NCSA AUDITORIUM

ABSTRACT

Virtual Reality (VR) & Augmented reality (AR) pose challenges and opportunities from both a technical and social perspective. We could now have digital, and not physical objects change our understanding of the world around us. It is a unique opportunity to change reality as we sense it.

At Microsoft Research we look new possibilities to extend our abilities when we are not bound by our physical limitations, enabling super-human abilities on one hand, and leveling the play field for people with physical limitations.

Dr. Ofek will describe efforts to design VR & AR applications that will adjust according to the user's uncontrolled environment, enabling a continuous use during work and leisure, over large variance of environments. He will also review efforts to extent the rendering to new capabilities such as haptic rendering.

SPEAKER BIO

Dr. Eyal Ofek is a principal researcher at Microsoft Research lab in Redmond, WA. His research interests include Augmented Reality (AR)/Virtual Reality (VR), Haptics, interactive projection mapping and computer vision for human-computer interaction.

He is on the editorial board of IEEE Computer Graphics and Application (CG&A), an associated editor of Virtual Reality and Human Behavior Journal (part of Frontiers in VR), co-chaired the 19th ACM SIGSPATIAL 2011, and on program committee for several leading conferences. Prior to joining Microsoft Research, Dr. Ofek obtained his PhD at the Hebrew University of Jerusalem and has founded a couple of companies in the area of computer graphics, including a successful drawing and photo editing application and developing the world first time-of-flight video cameras.

SESSION 1:
HEALTH INFORMATICS & COMPUTATIONAL BIOLOGY

FEB 27, 9:00 AM – 12:00 PM, CSL B02

SPONSORED BY ABBVIE

KEYNOTE: USING SMART EEG ANALYTICS TO PERSONALIZE TREATMENT FOR MEDICALLY REFRACTORY EPILEPSY
PROF. SRIDEVI V. SARMA, NEUROMEDICAL CONTROL SYSTEMS LAB, JOHNS HOPKINS

ABSTRACT

In this talk, the I will EZTrack, which uses personalized brain network models estimated from EEG data to accurately localize where seizures start in the brain - the epileptogenic zone (EZ). The problem is that EZ can be very difficult to find. In over 50% of cases, MRI scans look normal, forcing clinicians to localize the EZ by recording EEG activity. EZTrack is an analysis package that processes EEG data in minutes. EZTrack has been validated on a retrospective study. Importantly, had clinicians been using EZTrack, they would have been warned about misdiagnosis of the EZ and/or misplacement of electrodes and could have changed their treatment plan.

SPEAKER BIO

Dr. Sarma received her M.S. and Ph.D. degrees in Electrical Engineering and Computer Science from MIT, in 1997 and 2006, respectively. From 2006–2009, she was a Postdoctoral Fellow in the Brain and Cognitive Sciences Department at MIT. She is now an associate professor in the Institute for Computational Medicine, Department of Biomedical Engineering, at Johns Hopkins University. Her research interests include modelling, estimation and control of neural systems using electrical stimulation.

CLINICAL DECISION MAKING UNDER UNCERTAINTY: A BOOTSTRAPPED COUNTERFACTUAL INFERENCE APPROACH
INVITED STUDENT: ANIRUDH CHOUDHARY, GA TECH

ABSTRACT

Building clinical decision support systems, which includes diagnosing patients' disease states and formulating a treatment plan, is an important step toward personalized medicine (PM). In this paper, we address the problem of reliably estimating propensity score using bootstrapping and adversarial learning-based approaches. We incorporate both model and data uncertainty while estimating propensity score and propose a distributionally robust framework. Our experiments on two EHR datasets, MIMIC and Warfarin, involving varied clinical tasks, demonstrate the clear advantages of the proposed framework over existing standard off-policy learning and evaluation approaches.

SESSION OVERVIEW

Using Smart EEG Analytics to Personalize Treatment for Medically Refractory Epilepsy	Prof. Sridevi V. Sarma, JHU
Clinical Decision Making under Uncertainty	Anirudh Choudhary, Georgia Tech
Internetwork connectivity of molecular networks across species of life	Tarun Mahajan, UIUC
Deep-learning based 3D map sharpening in cryo-electron microscopy	Mona Zehni, UIUC
Framework for querying genome annotation files in a compressed form	Qingxi Meng, UIUC
The Metagenomic Binning Problem: Clustering Markov Sequences	Grant Greenberg, UIUC

SPEECH RECOGNITION: WHAT'S LEFT?
KEYNOTE: DR. MICHAEL PICHENY, NYU-COURANT INSTITUTE, COMPUTER SCIENCE AND THE CENTER FOR DATA SCIENCE

ABSTRACT

Recent speech recognition advances on the SWITCHBOARD corpus suggest that because of recent advances in Deep Learning, we now achieve Word Error Rates comparable to human listeners. Does this mean the speech recognition problem is solved and the community can move on to a different set of problems? In this talk, we examine speech recognition issues that still plague the community and contrast them to what is known about human perception. We highlight issues in accented speech, noisy/reverberant speech, speaking style, rapid adaptation to new domains, and multilingual speech recognition. We try to demonstrate that compared to human perception, there is still much room for improvement, so significant work in speech recognition research is still required from the community.

SPEAKER BIO

Dr. Picheny has worked in the Speech Recognition area since 1981, joining IBM after finishing his doctorate at MIT. He was heavily involved in the development of almost all of IBM's recognition systems, and most recently was responsible for putting out a set of Speech Services for both Speech Recognition and Speech Synthesis. Dr. Picheny was a manager for 35 years in the Speech area at IBM and led the Speech team in Yorktown Heights since 2007. He just retired from IBM and joined NYU-Courant Computer Science and the Center for Data Science as a part-time Research Professor.

PROGRESSIVE STOCHASTIC GREEDY SPARSE RECONSTRUCTION AND SUPPORT SELECTION

INVITED STUDENT: ABOLFAZL HASHEMI, UT AUSTIN

ABSTRACT

An important problem in signal processing is the problem of sparse reconstruction and sparse support selection, i.e., the task of inferring an arbitrary m dimensional sparse vector x having k nonzero entries from n random linear measurements of its components. Greedy-based algorithms achieve the optimal sampling complexity of n = O(k log(m/k)) with a computational complexity that is linear in the size of the data (m) and cardinality constraint (k). In this paper, we present the first sparse support selection algorithm that achieves exact identification of the optimal subset from O(k log(m/k)) measurements with complexity ~O(m) for arbitrary sparse vectors. The proposed scheme utilizes the idea of randomly restricting the search space of the greedy method in a progressive manner to reduce the computational cost while requiring only O(k log(m/k)) measurements for exact identification.

SESSION OVERVIEW

Speech Recognition: What's Left?	Dr. Michael Picheny, NYU-Courant Institute
Progressive Stochastic Greedy Sparse Reconstruction and Support Selection	Abolfazl Hashemi, UT Austin
Robot Sound Interpretation: Combining Sight and Sound in Learning-Based Control	Peixin Chang, UIUC
Chirality Nets for Human Pose Regression	Raymond Yeh, UIUC
Compressible Latent Space Invertible Networks for Compressive MRI	Varun Kelkar, UIUC
Polylogarithmic Width Suffices for Gradient Descent to Achieve Arbitrarily Small Test Error with Shallow ReLU Networks	Ziwei Ji, UIUC

SESSION 3: HIGH PERFORMANCE COMPUTING

FEB 28, 9:00 AM – 12:00 PM, CSL B02

SPONSORED BY NVIDIA

COMMUNICATION-AVOIDING SPARSE DIRECT SOLVERS FOR LINEAR SYSTEMS AND GRAPH COMPUTATIONS

KEYNOTE: PROF. RICH VUDUC,
HPC GARAGE, GEORGIA TECH

ABSTRACT

This talk describes several techniques to improve the strong scalability of a (right-looking, supernodal) sparse direct solver for distributed memory systems by reducing and hiding both internode and intranode communication. It also explains how to extend the same ideas to a graph problem, all-pairs shortest paths (APSP), exploiting the algebraic relationship between Gaussian elimination and APSP. The core idea is to reduce inter-node communication via a "communication-avoiding" 3D sparse LU factorization algorithm. The 3D algorithm reduces asymptotic communication costs by a factor of $O(sqrt(log\ n))$ and latency costs by a factor of $O(log\ n)$for planar sparse matrices arising from finite element discretization of two-dimensional PDEs. The methods also extend naturally to the case of heterogeneous CPU+GPU systems.

SPEAKER BIO

Richard (Rich) Vuduc is a Professor at the Georgia Institute of Technology. His research lab, The HPC Garage (@hpcgarage), is interested in high-performance computing, with an emphasis on algorithms, performance analysis, and performance engineering. He is a recipient of a DARPA Computer Science Study Group grant and an NSF CAREER award, among others. He received his Ph.D. in Computer Science from the University of California, Berkeley, and was a postdoctoral scholar in the Center for Advanced Scientific Computing the Lawrence Livermore National Laboratory.

RANDOMIZED SKETCHING ALGORITHMS FOR LOW MEMORY DYNAMIC OPTIMIZATION
INVITED STUDENT:
RAMCHANDRAN MUTHUKUMAR, JOHNS HOPKINS

ABSTRACT

This work develops a novel limited-memory method to solve dynamic optimization problems. The memory requirements for such problems often present a major obstacle, particularly for problems with PDE constraints. In these problems, PDE constraints uniquely determine the state of a physical system for a given control; the goal is to find the value of the control that minimizes an objective. This paper suggests using sketching to compress the state as it is generated and shows how to use the compressed state to reliably solve the original dynamic optimization problem. Numerical experiments with the sketched trust-region method show promising performance on challenging problems.

SESSION OVERVIEW

Communication-avoiding sparse direct solvers for linear systems and graph computations	Prof. Rich Vuduc, GATech
Randomized Sketching Algorithms for Low Memory Dynamic Optimization	Ramchandran Muthukumar, JHU
A Language for Programming Optimization Spaces	Thiago Teixeira, UIUC
Boosted Spin Channel Networks for Energy-efficient inference	Ameya Patil, UIUC
Improving the Performance of Overdecomposed Applications on GPU-accelerated Systems	Jaemin Choi, UIUC
Finite Precision Deep Learning with Theoretical Guarantees	Charbel Sakr, UIUC

SESSION 4: DECISION, CONTROL AND OPTIMIZATION

CONTROL OF NETWORKS: ALGORITHMS, FUNDAMENTAL LIMITATIONS, IMPOSSIBILITY RESULTS

KEYNOTE: PROF. ALEX OLSHEVSKY

CENTER FOR INFORMATION AND SYSTEMS ENGINEERING & DIVISION OF SYSTEMS ENGINEERING AT BOSTON UNIVERSITY

ABSTRACT

The abstract of this talk will be available on the conference webpage.

SPEAKER BIO

Professor Alex Olshevsky received the B.S. degree in applied mathematics and the B.S. degree in electrical engineering from the Georgia Institute of Technology, Atlanta, GA, USA, both in 2004, and the M.S. and Ph.D. degrees in electrical engineering and computer science from the Massachusetts Institute of Technology, Cambridge, MA, USA, in 2006 and 2010, respectively. He is currently an Assistant Professor with the Department of Electrical and Computer Engineering, Boston University, Boston, MA, USA., Dr. Olshevsky is a recipient of the National Science Foundation CAREER Award, the Air Force Young Investigator Award, the INFORMS Computing Society Prize for the best paper on the interface of operations research and computer science, and a Society for Industrial and Applied Mathematics (SIAM) Award for annual paper from the SIAM Journal on Control and Optimization chosen to be reprinted in SIAM Review.

OPTIMIZATION BASED ESTIMATION OF EXPECTED VALUES WITH APPLICATION TO STOCHASTIC PROGRAMMING
INVITED STUDENT: RAPHAEL CHINCHILLA, UCSB

ABSTRACT

Stochastic Programming, i.e., minimizing an expected value, is a recurring problem in engineering. While numerical methods to compute an expected value are generally efficient, numerical methods for solving Stochastic Programming have much slower convergence rate. We propose a novel approach to Stochastic Programming. Instead of solving the original problem, we minimize an upper bound to the expected value which is itself obtained through an optimization. Using state of the art numerical solvers, we can compute the solution to the upper bound problem with fast convergence rate and provide performance guarantees.

SESSION OVERVIEW

Control of Networks: Algorithms, Fundamental Limitations, Impossibility Results	Prof. Alex Olshevsky, Boston University
Optimization based estimation of expected values with application to stochastic programming	Raphael Chinchilla, UCSB
An Energy Shaping Control Method for Manipulating a Cyber-Octopus Soft Arm	Heng-Sheng Chang, UIUC
Accelerating formal verification of autonomous multi-agent systems using symmetry transformations	Hussein Sibai, UIUC
Convergence Guarantees of Policy Optimization Methods for Markovian Jump Linear Systems	Joao Paulo Jansch-Porto, UIUC
Biased Stochastic Gradient Descent for Conditional Stochastic Optimization and Its Applications in Meta-Learning	Yifan Hu, UIUC
Bandits with Temporal Constraints	Priyank Agrawal, UIUC

POSTER SESSION

|	Speaker	Poster Title
1	Khoi-Nguyen Mac	Learning Motion in Feature Space: Locally-Consistent Deformable Convolution Networks for Fine-Grained Action Detection
2	Ashok Vardhan Makkuva	Optimal transport mapping via input convex neural networks
3	Kanika Narang	FuseRec: Fusing user and item homophily modeling with temporal recommender systems
4	Tharun Medini	Extreme Classification using Count-Min Sketch
5	Amish Goel	Detection of universal adversarial perturbations in images.
6	Teck-Yian Lim	Early Fusion for Object Detection with FMCW radars and camera
7	Mohit Goyal	DZip: improved general-purpose lossless compression based on novel neural network modeling
8	Ananthan Nambiar	Transfer Learning for Cancer Drug Response Prediction
9	Anurendra Kumar	Gene regulatory network inference
10	Leila Shinn and Aditya Mansharamani	Applying machine-learning to human gastrointestinal microbial species to predict dietary intake
11	Shriyaa Mittal	Is Dodine a protein stabilizer or destabilizer? It's complicated!
12	Yuxuan Richard Xie	Single Cell Mass Spectrometry: Cell Classification through Interpretable Machine Learning and Data Integration
13	Sparsh Dayal Agarwal	A novel model predicting the West Nile Virus incidence rate across the US based on weather and socioeconomics factors
14	Kayvon Mazooji	On effective schemes for private shotgun DNA sequencing
15	Sisi He	Effects of cholesterol and statin prescriptions on ovarian cancer survival

POSTER SESSION (CONTD)

	Speaker	Poster Title
16	Elena Wilson and Jessica Saw	Fungus Dominates the Entombed Low-Diversity Microbiome of Calcium Oxalate Human Kidney Stones
17	Shubham Rawlani	Predicting West Nile Virus in Cook & DuPage County
18	Malachi Phillips	An Additive-Schwarz Preconditioner for the Incompressible Navier-Stokes on GPU
19	Seiyun Shin	Capacity of the erasure shuffling channel
20	Archit Patke	Ping-based HPC network monitoring
21	Haoran Qiu	An SLO-Oriented Cloud Ecosystem for Deploying Microservices
22	Brian Ko	Meta Differentiable Architecture Search
23	Pedro Bello-Maldonado	Highly Scalable Poisson Solvers on GPUs
24	Jean-Baptiste Bouvier	Resilient Reachability for Linear Systems
25	Negin Musavi	Optimistic Optimization for Statistical Model Checking with Regret Bounds
26	Aristomenis Tsopelakos	Sequential anomaly detection with observation control
27	Pulkit Katdare	Policy Transfer via Reward Augmentation
28	Ali Yekkehkhany	Risk-Averse Algorithms for Multi-Armed Bandits and Games
29	Jasvir Virdi	Design and Flight Evaluation of Deep Model Reference Adaptive Controller
30	Donghwan	Analysis of Q-Learning: Switching System Approach
31	Farhad Nawaz	Optimal graph-based planning with unknown target locations
32	Aditya Deshmukh	Sequential Controlled Sensing for Composite Multihypothesis Testing
33	Minh Vu	Iterative Optimal Control Synthesis for Nonlinear Systems with Model Uncertainty

ROBOTICS DEMONSTRATION SESSION
FEB 28, 12:00 PM – 2:00 PM, CSL STUDIO

This session provides a platform for students across the campus to gain exposure for their research and to disseminate and exchange ideas. The aim is to stimulate interaction among researchers and hopefully foster a close bond in the robotics community of our university.

MAP/LIST OF ROBOTICS DEMONSTRATIONS WILL BE AVAILABLE ON THE MORNING OF FRIDAY 28TH FEB.
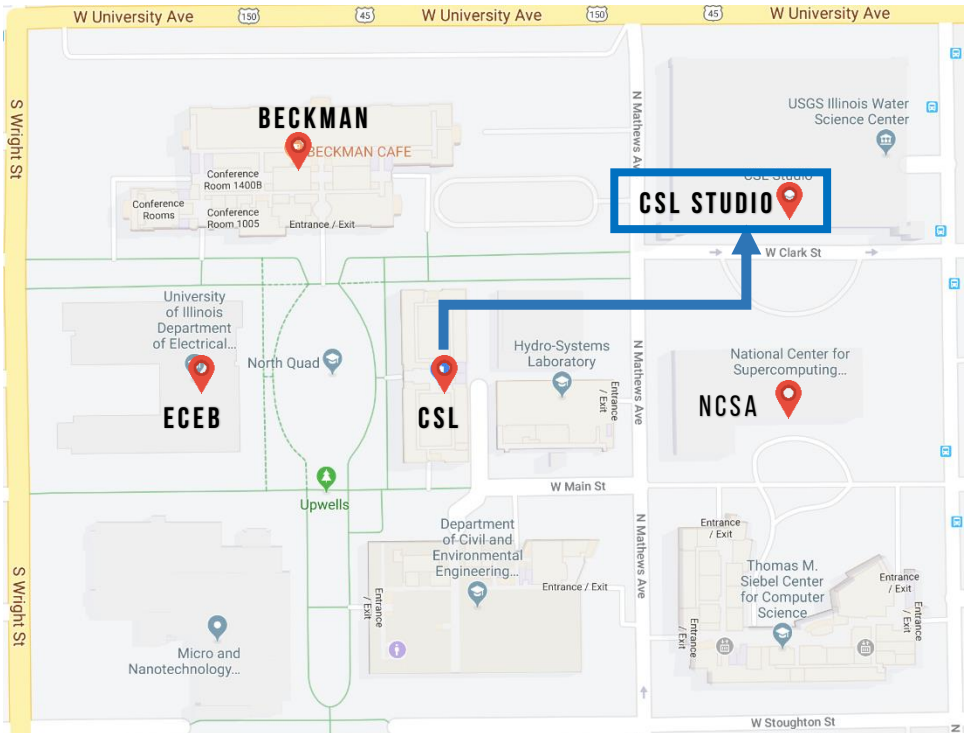
SPECIAL THANKS TO:

- Tracy Hunter
- Prof. Klara Nahrstedt
- Normand Paquin
- Kim Gudeman
- Karen Cromwell
- Harold Javid
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