

EcoCloud e-newsletter

May 2015

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Welcome Message from the Executive Committee

Welcome to this edition of EcoCloud's electronic newsletter. The EcoCloud Annual Event will be held on June 22nd and 23rd at **Lausanne Palace**. This year's event features an exciting lineup of EcoCloud and industrial speakers and presenters. In this newsletter, we are also delighted to announce two additions to our Industrial Affiliate Program, a new EcoCloud faculty member expanding our research portfolio in energy management, and the latest news on our research, accomplishments and outreach.

In the News

Annual Event 2015

EcoCloud will hold its annual event on June 22nd and 23rd, 2015 at Lausanne Palace. The event will kick off on Monday evening with a Keynote by Raghu Ramakrishnan on Big Data at Microsoft followed by a poster session and cocktail. The event will continue with a full day of presentations from EcoCloud researchers and industrial presentations from AXA Tech, Cloudera, IBM, Micron and Oracle. The event showcases EcoCloud's diverse research portfolio and will cover a broad set of topics from new algorithms in machine learning to the latest cooling technologies. You can find more information on the event [here](#).

Clouds, Datacenters & the Future of IT

EcoCloud's article titled "Clouds, Datacenters & the Future of IT" appeared in L'Hebdo's January 29th issue this year. L'Hebdo is the most widely circulated weekly magazine in the French part of Switzerland focusing on Swiss and international politics, business and current social events. The article describes the emergence of data-centric information technology and its impact on knowledge-based economies such as that of Switzerland to the broader public. The article can be found [here](#).

CloudSuite Tutorial

As part of our outreach program, we held a two-day tutorial on "Rigorous and Practical Server Design Evaluation" at EPFL on February 2nd and 3rd. Participants from Georgia Tech, KTH, Stony Brook University, University of Edinburgh and EPFL attended the tutorial. The tutorial covered exciting topics on CloudSuite, our open-source suite of scale-out workloads in use by both industry and academia at large, and how to use it for rigorous server design evaluation.

DSL Summer School at EPFL

Vojin Jovanovic, Manohar Jonnalagedda and Sandro Stuki, EcoCloud PhD students with their colleague Georg Ofenbeck from ETH will be organizing the first Summer School on DSL Design and Implementation to be held at EPFL from July 12th to 17th, 2015. The school is an opportunity for students to interact and learn from leading experts in the field of Domain Specific Languages (DSL). The topics to be covered include DSL design and implementation, dynamic compilation, DSLs for databases, reconfigurable computing, and DSLs for heterogeneous platforms. The summer school is open to all grad students in computer science and engineering with basic knowledge of the field. For more information, please click [here](#).

EcoCloud: A Founding Member of Perfkit

EcoCloud along with several academic and industrial institutions joined efforts with Google to launch Perfkit, an open-source framework to analyze and compare the performance of cloud platforms and services. The consortium will collaborate to establish a set of common benchmarks to measure throughput, latency, variance, and overhead in cloud services and platforms and will create tools to help interpret and visualize results. You can find more information on Perfkit [here](#).

John Thome on InterPACK Panel

John Thome, along with experts from AVC, a leading provider of thermal solutions, Google, Intel and Stanford University will discuss challenges associated with cooling in digital platforms from mobiles to servers during a panel at the International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK). The experts are asked to share their vision on the future of electronic thermal management, packaging, and cooling technologies. You can find more information on InterPack 2015 [here](#)

Retirement after distinguished career

After a long and distinguished career, André Schiper, a renowned expert in distributed computing and a member of the EcoCloud family, retired from EPFL. André has been a professor of computer science at EPFL since 1985. We wish André a happy retirement.

New Members

Faculty Member

We are delighted to welcome Colin Jones, an Assistant Professor in Mechanical Engineering and an expert in control and smart energy systems, to the EcoCloud research community. Colin is an ERC Starting Grant winner whose research interests include model predictive control, convex optimization, computational geometry and systems for clean energy. Colin received his Ph.D. in Control Theory from the University of Cambridge in 2005. Prior to joining EPFL in 2010, he was a Senior Researcher at the Automatic Control Laboratory at ETH. Colin will strengthen EcoCloud expertise in systems optimization and integration in the datacenter.

Industrial Affiliate Members

EcoCloud welcomes AXA-Technology Services and IBM to the Industry Affiliate Program. AXA-Technology Services provide high quality IT and telecommunications infrastructure to

the AXA Group, a worldwide leader in financial services. IBM is a multinational technology and consulting corporation specializing in hardware, software, infrastructure, and hosting services. We look forward to fruitful collaborations with AXA Tech and IBM on data-centric technologies and energy-efficient platform design.

New Projects

Reconciling Flexibility and Predictability in Computer Networks

ERC Starting Grant winner, Katerina Argyraki, intends to change network systems design at a fundamental level to handle current networks fundamental architectural limitations using “virtual data planes”. The latter enable networks to evolve and adapt to the needs of users and operators as well as the growing capabilities of adversaries. Virtual data planes combine flexibility through programmability with performance, security and energy efficiency in networks. “We expect our approach to have the same profound impact on programmability of network equipment that virtual memory had in the 60s on the programmability of general-purpose computers, delegating the memory hierarchy management to the operating system, to allow for just one, simple, directly addressable memory” said Katerina.

Visiting Scholars

Our visiting scholars in 2015 are professors Sarita and Vikram Adve from University of Illinois at Urbana-Champaign (UIUC). Sarita is a Maurice-Wilkes award and Sloan fellowship award winner, a fellow of ACM and IEEE, and a world-renowned researcher in computer architecture, memory models in multiprocessors, and architectures for reliable computing. Vikram is an ACM Fellow and the founder of LLVM, the most widely-adopted open-source modular and reusable compiler toolchain in use by industry and academia. Vikram has received the NSF Career Award and the Outstanding Junior Faculty Award at the UIUC Computer Science Department.

Awards

Conference Awards

Alexandra Olteanu, Anne-Marie Kermarrec and Karl Aberer received the 2014 best paper award from the Web Information System Engineering (WISE) for their paper on “Comparing the Predictive Capability of Social and Interest Affinity for Recommendations”. The paper highlights the importance of social affinity — how well-connected people are in a social graph — as a predictor of user’s taste as compared to interest affinity — how similarly users rate or how items are rated.

Yassir Madhour, Brian D’Entremont, Jackson Braz Marcinichen, Michel Bruno and John Thome received the 2014 ASME Journal of Electronic Packaging best paper award for their paper on “Modeling of Two-Phase Evaporative Heat Transfer in 3-Dimensional Microcavity High-Performance Microprocessor Chip Stacks”. The paper presents a novel simulation methodology for heat flow distribution in a liquid-cooled 3D server chip.

Faculty Awards

Martin Odersky received the 2014 Swiss ICT Special Award for his development of Scala, a platform-independent, scalable programming language widely used in academia and industry. Scala technologies will also play a key role in improving datacenter efficiency with code specialization across a variety of heterogeneous compute platforms. According to the award committee, Martin is “representative of the innovative force and successful

commercialization of research projects in the industry in the best traditions of Swiss universities.”

Student Awards

Manos Karpathiotakis received the prestigious and highly competitive IBM Ph.D. Fellowship award. The IBM Ph.D. Fellowship Awards Program is an intensely competitive worldwide program, which honors exceptional Ph.D. students who have interest in solving problems that are important to IBM and fundamental to innovation in many academic disciplines and areas of study. Manos is working on **RAW**, a database system operating directly over raw data files with Just-In-Time query operators.

Tudor David won the prestigious VMware Graduate Fellowship for the 2015-2016 academic year. The VMware fellowships are awarded to outstanding students pursuing research related to VMware’s business interests including core machine virtualization and cloud computing. Tudor’s research is on portably scalable concurrent search data structures.

Publications:

Analytics

- **Active Learning of Self-concordant Like Multi-Index Functions**, I. Bogunovic, V. Cevher, J. Haupt and J. Scarlett, ICASSP, 2015.
- **An Inexact Proximal Path-Following Algorithm for Constrained Convex Minimization**, Quoc Tran-Dinh, A. Kyrillidis and V. Cevher, SIAM Journal On Optimization, 2014.
- **A Totally Unimodular View of Structured Sparsity**, M. El Halabi and V. Cevher, AI & Statistics, 2015.
- **Bilinear Generalized Approximate Message Passing—Part I: Derivation**, J. T. Parker, P. Schniter and V. Cevher, IEEE Transactions on Signal Processing, vol. 62, num. 22, 2014.
- **Bilinear Generalized Approximate Message Passing—Part II: Applications**, J. T. Parker, P. Schniter and V. Cevher, IEEE Transactions on Signal Processing, vol. 62, num. 22, 2014.
- **Cofactorization on GPUs**, A. Miele, J. W. Bos, T. Kleinjung and A. K. Lenstra, 16th International Workshop on Cryptographic Hardware and Embedded Systems (CHES), 2014.
- **Comparing the Predictive Capability of Social and Interest Affinity for Recommendations**, A. Olteanu, M. Kermarrec and K. Aberer, 15th International Conference on Web Information Systems Engineering (WISE), 2014.
- **Convexity in Source Separation: Models, Geometry, and Algorithms**, M. McCoy, V. Cevher, Q. Tran Dinh, A. Asaei and L. Baldassarre, IEEE Signal Processing Magazine, vol. 31, num. 3, 2014.
- **Learning Non-Parametric Basis Independent Models from Point Queries via Low-Rank Methods**, H. Tyagi and V. Cevher, Applied And Computational Harmonic Analysis, vol. 37, num. 3, 2014.
- **Online Unsupervised State Recognition in Sensor Data**, J. Eberle, T. K. Wijaya and K. Aberer, IEEE International Conference on Pervasive Computing and Communications (PerCom), 2015.
- **SMART: A Tool for Analyzing and Reconciling Schema Matching Networks**, Q. V. H. Nguyen, T. T. Nguyen, V. T. Chau, T. K. Wijaya, Z. Miklos, K. Aberer, A. Gal and M. Weidlich, ICDE, 2015.
- **Stochastic Spectral Descent for Restricted Boltzmann Machines**,

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- **WASP: Scalable Bayes via Barycenters of Subset Posteriors**, S. Srivastava, V. Cevher, Q. Tran Dinh and D. B. Dunson, *AI & Statistics*, 2015.

Data Clouds & Management

- **Approximation Schemes for Many-Objective Query Optimization**, I. Trummer and C. Koch, *SIGMOD*, 2014.
- **B-hist: Entity-Centric Search over Personal Web Browsing History**, M. Catasta, A. Tonon, G. Demartini, J.-E. Ranvier and K. Aberer, *Journal Of Web Semantics*, vol. 27-28, 2014.
- **BF-Tree: Approximate Tree Indexing**, M. Athanassoulis and A. Ailamaki, *VLDB*, 2015.
- **Convex Optimization for Big Data**, V. Cevher, S. Becker and M. Schmidt, *IEEE Signal Processing Magazine*, vol. 31, num. 5, 2014.
- **How to Stop Under-Utilization and Love Multicores**, A. Ailamaki, E. Liarou, P. Tözün, D. Porobic and I. Psaroudakis, *ICDE*, 2015.
- **Just-In-Time Data Virtualization: Lightweight Data Management with ViDa**, M. Karpathiotakis, I. Alagiannis, T. Heinis, M. Branco and A. Ailamaki, *CIDR*, 2015.
- **Minimizing Efforts in Validating Crowd Answers**, Q. V. H. Nguyen, C. T. Duong, M. Weidlich and K. Aberer, *SIGMOD*, 2015.
- **Online Updates on Data Warehouses via Judicious Use of Solid-State Storage**, M. Athanassoulis, S. Chen, A. Ailamaki, P. Gibbons, R. Stoica, *ACM Transaction on Database Systems*, vol. 40 num. 1, 2015.
- **Reconsolidating Data Structures**, T. Heunis, A. Ailamaki, *EDBT*, 2015.
- **Result Selection and Summarization for Web Table Search**, T. T. Nguyen, Q. V. H. Nguyen, M. Weidlich and K. Aberer, *ICDE*, 2015.
- **Scalable and Adaptive Online Joins**, M. ElSeidy, A. Elguindy, A. Vitorovic and C. Koch, *VLDB*, 2014.
- **Smooth Scan: Statistics-Oblivious Access Paths**, R. Borovica-Gajic, S. Idreos, A. Ailamaki, M. Zukowski and C. Fraser, *ICDE*, 2015.
- **Tag-Based Paper Retrieval: Minimizing User Effort with Diversity Awareness**, Q. N'Guyen, T. N'Guyen, S. Do and K. Aberer, *DASFAA*, 2015.
- **Time- and Space-Efficient Sliding Window Top-k Query Processing**, K. Pripuzic, I. Podnar Zarko and K. Aberer, *ACM Transaction on Database Systems* vol. 40 num. 1, 2015.
- **Time–Data Tradeoffs by Aggressive Smoothing**, J. J. Bruer, J. A. Tropp, V. Cevher and S. R. Becker, *NIPS*, 2014.

Power Management & Cooling

- **Boiling Augmentation With Micro/Nanostructured Surfaces: Current Status And Research Outlook**, S. Bhavnani, V. Narayanan, W. Qu, M. Jensen, S. Kandlikar and J. R. Thome, *Nanoscale and Microscale Thermophysical Engineering*, vol. 18, num. 3, 2014.
- **Intermittent Dewetting and Dryout of Annular Flows**, N. Borhani and J. R. Thome, *International Journal Of Multiphase Flow*, vol. 67, 2014.
- **Sudden Expansions in Circular Microchannels: Flow Dynamics and Pressure Drop**, S. Khodaparast, N. Borhani and J. R. Thome, *Microfluidics and Nanofluidics*, vol. 17, num. 3, 2014.

Programming Models & Scalability

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A. Prokopec and M. Odersky, LCPC, 2014.
- **Staged Parser Combinators for Efficient Data Processing,**
M. Jonnalagedda, T. Coppey, S. Stucki, T. Rompf and M. Odersky, OOPSLA, 2014.
- **Ying-Yang: Concealing the Deep Embedding of DSLs,**
V. Jovanovic, A. Shaikhha, S. Stucki, V. Nikolaev and C. Koch and M. Odersky, GPCE, 2014.

Robust Systems & Networks

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V. Kuznetsov, L. Szekeres, M. Payer, G. Candea and R. Sekar, OSDI, 2014.
- **Consensus Inside,**
T. A. David, R. Guerraoui and M. Yabandeh, MIDDLEWARE, 2014.
- **D2P: Distance-Based Differential Privacy in Recommenders,**
R. Guerraoui, A. Kermarrec, R. Patra, M. Taziki, PVLDB vol. 8 num. 8, 2015.
- **High System-Code Security with Low Overhead,**
J. Wagner, V. Kuznetsov, A. Nadeem, J. Kinder and G. Candea, IEEE Symposium on Security and Privacy, 2015.
- **Personalizing Top-k Processing Online in a Peer-to-Peer Social Tagging Network,**
X. Bai, R. Guerraoui and A.M. Kermarrec, ACM Transactions On Internet Technology, vol. 13, num. 4, 2014.
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- **Big Data [Guest Editors' Introduction],**
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- **Manycore Network Interfaces for In-Memory Rack-Scale Computing,**
A. Daglis, S. Novakovic, E. Bugnion and B. Grot, ISCA 2015.
- **Unison Cache: A Scalable and Effective Die-Stacked DRAM Cache,**
D. Jevdjic, G. H. Loh, C. Kaynak and B. Falsafi, MICRO, 2014.