Hans Walter Behrens

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Summary

I am a fourth-year Ph.D. student and Dean's Fellow at Arizona State University. My research focus is on adversarially-resilient cooperative systems, especially in distributed ad hoc networks, as well as techniques for privacy preservation and decentralized autonomous decision-making.

Education

- **Arizona State University** — Tempe, AZ
  Doctor of Philosophy, Computer Science (GPA: 4.12/4.00) — *2016 – 2021 (Expected)*
  Co-Advised by Profs. K. Selçuk Candan & Gail-Joon Ahn
- **Arizona State University** — Tempe, AZ
  Master of Computer Science — *2020*
- **University of California, Irvine** — Irvine, CA
  Bachelor of Science, Information & Computer Science — *2004 – 2007*

Refereed Publications

- **Pando: Byzantine-Resistant Sensor Fusion through Hierarchical Overlay Ensembles**
  HW Behrens and KS Candan
  In Submission
- **DataStorm: Coupled, Continuous Simulations for Complex Urban Environments**
  HW Behrens, KS Candan, X Chen, Y Garg, ML Li, X Li, S Liu, ML Sapino
  In Submission
- **WindRose: Adversarially-Resistant Oblivious Routing with Masked Geographic Targeting**
  HW Behrens and KS Candan
  In Submission
- **Practical Security for Cooperative Ad Hoc Systems**
  HW Behrens and KS Candan
  *IEEE Conference on Pervasive Computing and Communications (**PerCom**) 2020*
  Forum Track
- **Velocity: Scalability Improvements in Block Propagation Through Rateless Erasure Coding**[1]
  N Chawla, **HW Behrens**, D Tapp, D Boscovic, and KS Candan
  *IEEE International Conference on Blockchain and Cryptocurrency (**ICBC**) 2019*
  Research Track
- **Load-Adaptive Continuous Coupled-Simulation Ensembles with DataStorm and Chameleon**
  HW Behrens, ML Li, A Gadkari, Y Garg, X Chen, S Liu, and KS Candan
  *Chameleon User Meeting (**CHUM**) 2019*
  Demonstration Track
- **Adversarially-Resistant On-Demand Topic Channels for Wireless Sensor Networks**
  HW Behrens and KS Candan
  *IEEE International Symposium on Reliable Distributed Systems (**SRDS**) 2018*
  Research Track

[1] Finalist for Best Paper Award

- **DataStorm-FE: A Data- and Decision-Flow and Coordination Engine for Coupled Simulation Ensembles**
  HW Behrens, KS Candan, X Chen, A Gadkari, Y Garg, ML Li, *et al.*
  *International Conference on Very Large Data Bases (**VLDB**) 2018*
  Demonstration Track

- **Lightweight Authentication of Fault-Tolerant Topic-Channel Queries in Distributed Systems**
  HW Behrens and KS Candan
  *ACM International Symposium on High-Performance Parallel and Distributed Computing (**HPDC**) 2018*
  Consortium Track

Service

- **Conference Volunteer:** *(2017)* CODASPY; *(2018)* HPDC; *(2019)* PLDI
- **Publication Reviewer:** *(2017)* ASONAM, TKDE; *(2018)* DASFAA, EDBT, EUROPAR, SIGKDD, TKDE; *(2019)* DASFAA, ICDE, TCC, TKDE
- **Student Program Committee:** *(2019)* S&P
- **ASU Committees:** University Hearing Board, Teaching Excellence Award Committee, Family Resources Advisory Board
- **Graduate Student Mentorship Program:** Designed, implemented, and ran a peer mentorship program pairing junior and senior graduate students within the department (≈300 PhD students) for academic, social, and professional support. Participants reported higher program satisfaction, improved mental health, and better team cohesion within and across research groups.

Professional Experience

- **Arizona State University** — Tempe, AZ
  Dean's Fellow, Graduate Research Assistant, & Graduate Teaching Assistant — *Aug 2016 - Present*
  - Awarded the prestigious Dean's Fellowship, a four-year paid fellowship reserved for the most promising Ph.D. students from each incoming class.
  - Sole instructor for an introductory engineering course (ASU 101), responsible for curriculum design, lecture delivery, and grade evaluation of 130 undergraduate students.
  - Designed and conducted a personal research agenda, under the Center for Assured and SCAlable Data Engineering (CASCADE), to explore novel ideas in the intersection of scalability and security.
  - Successfully managed a team of graduate and undergraduate students in achieving our ambitious research goals, and leading to a successful top-tier publication of our complex distributed system.

- **Canela Software, Inc.** — Temecula, CA
  Chief Technical Officer — *Nov 2015 – Jul 2016*
  - Coordinated a major business pivot, requiring reallocation of approximately 85% of development resources. This pivot successfully produced a well-received prototype, and generated significant new client interest.
  - Proposed, designed, and executed a complete overhaul of developmental process company-wide; proposals influenced release deployment, change management, issue tracking, code review, regression testing, and more.
  - Organized a widespread shift to more well-defined agile methodologies, especially Scrum, to increase team flexibility to customer-driven changes; this flexibility proved a critical enabling factor for the success of our pivot.

- *Principal Software Engineer* — *Jul 2011 – Nov 2015*
  - Designed and implemented enhancements to the software licensing system, enabling SaaS deployments, increasing enterprise penetration, and converting 5% of gross revenue to recurring revenue.
  - Created an in-app store and purchasing system, increasing adoption of add-on products by 40%.
  - Architected, designed, and rolled out a completely custom cloud database, opening up completely new markets and reducing cloud development overhead by almost 75%.

- *Senior Software Engineer* — *Mar 2009 – Jul 2011*

- Built a new online software licensing system, reducing accounting workload by 4 hours per day, decreasing software piracy by over 95%, and increasing revenue by 14% year over year.
- Created an automatic update architecture to deploy incremental updates to over 10,000 client systems, reducing support requests by 12% and permitting the rapid release of new features.

- *Software Engineer* *Jan 2008 – Mar 2009*
  - Designed a new calibration algorithm to increase rendering precision, which reduced measurement error below 0.01 mm and increased diagnosis accuracy by 4%.
  - Implemented a serial-to-USB interface for a new control method, increasing margins in regional markets by $125/unit.
  - Added multi-monitor support to a diagnostic product, a feature which is now used by 10% of all installations.

Honors & Awards

- **Upsilon Pi Epsilon ($\Upsilon\Pi E$),** ACM Computing Honors Society, Founding President *(Alpha Chapter of AZ).*
- **Phi Kappa Phi ($\Phi K\Phi$),** Graduate Honors Society, Member.
- **Eta Kappa Nu (HKN),** IEEE Honors Society, Member.
- **Herbold Foundation Graduate Engineering Scholarship,** *(2019)* for outstanding engineering graduate students.
- **Achievement Rewards for College Scientists (ARCS) Foundation Scholar,** *(2019, Nominee)* for scholastically outstanding doctoral students.
- **Nora J. Folkenflik Memorial Essay Prize,** for outstanding written communication.
- **Chancellor's Achievement Scholarship,** awarded to the top 0.1% of undergraduates.
- **Travel Grant Awardee:** *(2019)* NDSS, CHUM

Technical Skills

- **Primary Languages:** Python, C++
- **Automation:** Ansible, OpenStack, Vagrant, Docker, Kubernetes
- **Libraries:** NumPy, SciPy, Matplotlib, NetworkX
- **Others:** Git, Linux, Unix, Ubuntu, Debian, CentOS, Bash, Zsh, LaTeX

Relevant Coursework

- **Applied Cryptography:** Using cryptography to secure communication protocols over networked systems, including signatures, certificates, timestamps, elections, digital cash, and other multiparty coordination.
- **Artificial Intelligence:** Definitions of intelligence, computer problem solving, game playing, pattern recognition, theorem proving, and semantic information processing; evolutionary systems; heuristic programming.
- **Bio-Inspired Computing:** Discussing computational methods derived from biological processes and models including: evolution, immunology, social insects, metabolic scaling, and epidemiology.
- **Cloud Computing:** Virtualization, cloud computing, programmable networking, performance evaluation, information assurance, distributed and parallel computing, and cloud computing-based applications.
- **Data Visualization:** Covers techniques and algorithms for creating effective visualizations based on principles from graphic design, visual art, perceptual psychology and cognitive science to enhance the understanding of complex data.

- **Distributed & Multiprocessor Operating Systems:** Distributed systems architecture, remote file access, message-based systems, object-based systems, client/server paradigms, distributed algorithms, replication and consistency, and multiprocessor operating systems.
- **Distributed Database Systems:** Distributed database design, query processing, and transaction processing; distributed database architectures and interoperability; emerging technologies.
- **Foundations of Algorithms:** Advanced topics in formal algorithm design and analysis, including advanced shortest-paths algorithms, amortized analysis, network flows, NP-completeness, selected topics in computational geometry, as well as distributed, parallel, randomized, and approximation algorithms.
- **Multimedia and Web Databases:** Data models for high-dimensional and graph data; query processing and optimization for inexact retrieval; advanced indexing, clustering, and search techniques in high-dimensional spaces.
- **Statistical Machine Learning:** Spectral clustering, regression, classification, semi-supervised learning, feature reduction, manifold learning, ranking, kernel learning and multitask learning.