

DR. LUKAS KENCL

122 Richmond Road, Cambridge CB4 3PT, United Kingdom

E-mail: lukas.kencl@ieee.org; Telephone: +44-(0)790-2287839; Homepage: <http://icapeople.epfl.ch/lkencl/>

PROFILE

An established researcher and project leader with experience from prominent industrial technology centres, I am currently looking for a challenging senior position. My broad expertise includes: architecture and security of networking systems; network resistance, robustness and performance optimization; collection, privacy-protection and mining of network data; and communication networks' architecture, protocols and applications in general.

HIGHLIGHTS

- Seven years of industrial research experience in network architecture and security (*Intel Research Cambridge, IBM Zurich Research Laboratory*)
 - Led or contributed to successful network technology projects (*Traffic-Aware Packet Filter, Sequence-preserving Load Balancer, CoMo Pattern Pre-processor, Traffic Engineering Reference Platform*)
 - *Ph.D. degree* (2003) in Communication Networks from the *Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland*;
 - Consistently publishing at research journals and conferences of high standard, holder of multiple patents in network technology;
 - *Micro MBA Program graduate, Managing through People (MTP) Program graduate.*
-

PROFESSIONAL HISTORY

Intel Research Laboratory, Cambridge, UK
Senior Researcher

June 2003 – December 2006

◆ “*Adaptive Methods for Networking Systems*” (*Project Leader*)

This project develops methods and algorithms for robust and attack-resistant networking devices that are context-aware and seamlessly adapt to the immediate network traffic profile. Specifically, we designed a prototype of an open-source traffic-adaptive firewall ‘Adaptree’, showing vast performance improvements over static solutions and ability to mitigate a Denial-of-Service attack. This project has been showcased at the Research@Intel Day in Santa Clara, CA, and the Intel Developer Forum (IDF), attracting worldwide press coverage (NetworkWorld, Forbes, ACM Tech News) as well as both internal and external tech transfer interest. It involves collaborators from high-profile academic institutions (EPFL, Switzerland; Eurecom, France; TU Munich, Germany; Charles University, Czech Rep.; UT Austin, Northwestern, USA).

◆ “*CoMo: Platform for Rapid Prototyping of Network Forensics Applications*” (*Project Contributor*)

CoMo is an open platform to enable quick deployment of novel applications for collection and mining of network data, such as detecting intrusions or anomalies. I led the work on improving the algorithmic primitives of the platform. The Pattern Pre-processor for accelerating malicious pattern matching in IDS devices has been patented by Intel and shown to reduce the pattern matching workload by 85%. CoMo software has been adopted by over 50 institutions worldwide.

◆ “*Content Anonymization*” (*Project Leader*)

Protection of sensitive data is crucial for information sharing and communication among parties that do not necessarily trust each other. This project studies computational techniques to hide the sensitive information, while preserving some ability to perform pattern matching, data mining or statistical analysis over the data. We have designed an original anonymization method based on repeats-insertions and permutations.

Department of Applied Mathematics, Charles University, Prague
Visiting Professor

2005 - present

“*Applied Mathematics in Industrial Research*” *Lecture*

I run a lecture of worldwide industrial research speakers (Intel Research, Microsoft Research, NTT DoCoMo Labs, Qualcomm Research, Schlumberger Research).

Department of Systems, IBM Zurich Research Laboratory <i>Pre-Doc</i> “Linux Traffic Engineering Reference Platform (TERP)” (Project Contributor) This project of the Network Processor Software Group delivered a world’s first traffic-engineering suite for the IBM PowerNP Network Processor, including DiffServ and MPLS. Contributed the MPLS- and DiffServ-labeling datapath.	1999 - 2003
Eurotel (Telefonica O2), GSM Operator, Prague <i>Network Design Specialist</i> “Nokia Intelligent Network (IN)” - member of the team performing the setup of IN in Eurotel’s GSM network.	1998
VUMS Software, Prague <i>Oracle Data Warehouse Consultant</i>	1997

EDUCATION

<i>Ph.D. in Communication Networks</i> Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland Thesis Topic: "Load Sharing in Multiprocessor Network Nodes" Advisor: Prof. Jean-Yves Le Boudec http://www.epfl.ch/	1999 - 2003
<i>Micro MBA Program</i> Thunderbird, New York and Columbia University Professor Team Introductory MBA courses in: <i>Finance, Marketing and Strategy.</i>	2000 - 2001
<i>Graduate School of Communication Systems</i> Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland Courses: <i>Computer Networking, Communication Security, Stochastic Models for Communications, Information Theory, Distributed Systems, etc.</i>	1997-1998
<i>M.S. in Computer Science</i> Faculty of Mathematics and Physics, Charles University, Prague http://www.ms.mff.cuni.cz	1988 - 1995

SKILLS AND EXPERTISE

- ◆ *Managing Through People (MTP)* graduate - a set of Intel courses preparing for a management position;
- ◆ Experienced in project leadership and successful supervision of interns and collaborators of diverse nationality and background (e.g. *Christian Schwarzer*, who obtained a *Best Thesis Award at EPFL, Switzerland*, for his work at Intel Research Cambridge);
- ◆ Highly experienced presenter from many industrial and academic venues;
- ◆ Strong background in network architecture and security, network protocols, intrusion detection, pattern matching, packet filtering, autonomous networking, data mining, combinatorial optimization;
- ◆ TCP/IP, MPLS, DiffServ; MS Windows, Linux, UNIX; Snort; Matlab, ns-2; C/C++, Java, Perl, Python, Oracle Objects; Oracle Express; MS Office, LaTeX.

LANGUAGE PROFICIENCY

Czech (native), English (fluent), German (fluent), French (fair), Russian (fair).

PROFESSIONAL ACTIVITIES

- ◆ Member, Communications Research Network (CRN) DoS-Resistant Internet Working Group;
- ◆ Participant and contributor, 2005 CRA Conference on Grand Research Challenges in Computer Architecture;
- ◆ TPC Member of the IEEE/IFIP MMNS04-06 and the IEEE ICCAS06 Conferences;
- ◆ Reviewer, IEEE/ACM ToN, CCR, COMNET, INFOCOM, SIGCOMM, ICNP, MMNS, ICCAS;
- ◆ Member of the IEEE and the ACM.

PUBLICATIONS

Journal

L. Kencl, J.-Y. Le Boudec, "**Adaptive Load Sharing for Network Processors**", In *IEEE/ACM Transactions on Networking*, to appear.

L. Kencl, R. Haas, P. Droz, A. Kind, B. Metzler, C. Jeffries, R. Pletka, M. Waldvogel, "**Creating Advanced Functions on Network Processors: Experience and Perspectives**", In *IEEE Network*, Vol. 17, No. 4, July 2003.

Conference

Weiguang Shi, Lukas Kencl, "**Sequence-Preserving Adaptive Load Balancers**", *Proceedings of the ACM/IEEE Symposium on Architectures for Networking and Communication Systems (ANCS)*, San Jose, CA, USA, December 2006.

Ramaswamy Ramaswamy, Lukas Kencl, Gianluca Iannaccone, "**Approximate Fingerprinting to Accelerate Pattern Matching**", *Proceedings of the ACM Internet Measurement Conference (IMC) 2006, Rio de Janeiro, Brazil*, October 2006.

Lukas Kencl, Christian Schwarzer, "**Traffic Adaptive Packet Filtering of Denial of Service Attacks**" *Proceedings of the International IEEE Workshop on Autonomic Communications and Computing (ACC)*, Niagara-Falls, NY, USA, June 2006.

Lukas Kencl, Jose Zamora, Martin Loeb, "**Packet Content Anonymization by Hiding Words**", *Demo at IEEE INFOCOM*, Barcelona, Spain, April 2006.

Lukas Kencl, "**Brain-supportive Computing**", *CRA Conference on Grand Research Challenges in Computer Architecture*, Monterrey Bay, CA, USA, December 2005.

Nils Kammenhuber, Lukas Kencl, "**Efficient Statistics Gathering from Tree-Search Methods in Packet Processing Systems**" *Proceedings of IEEE ICC 2005*, Seoul, Korea, May 2005.

Andrea Bergamini, Lukas Kencl, "**Network of Shortcuts: An Adaptive Data Structure for Tree-based Search Methods**", *Proceedings of IFIP Networking 2005*, Waterloo, Canada, May 2005.

L. Kencl, M. Pias, S. Pennock, A. Bramley, D. Kerwin, P. Shepherd, G. Trewartha, "**A System for Radio Tracking of Team-Sports Players**", *Poster at the Ubicomp 2004 Conference*, Nottingham, September 2004.

L. Kencl, J.-Y. Le Boudec, "**Adaptive Load Sharing for Network Processors**", In *Proceedings of IEEE INFOCOM*, New York, NY, USA, June 2002.

E. Bowen, C. Jeffries, L. Kencl, A. Kind, R. Pletka, "**Bandwidth Allocation for Non-Responsive Flows with Active Queue Management**", *International Zurich Seminar on Broadband Communications*, Zurich, Switzerland, February 2002.

L. Kencl, B. Radunovic, "**General Method for Finding the Most Economical Distributed Router Architecture**", *Comm. Networks and Distributed Systems Modeling and Simulation Conference (CNDS)*, San Antonio, TX, January 2002.

Technical reports

A. Gupta, L. Kencl, "**Space-Optimal Algorithm for Identifying Disjoint Heavy-hitter Nodes in a Packet Search Tree**", *Intel Research Report*, June 2006.

R. Russo, L. Kencl, B. Metzler, P. Droz, "**Scalable and Adaptive Load Balancing on IBM PowerNP**", *IBM Research Report No. RZ-3431*, July 2002.

Patents

L. Kencl, G. Iannaccone, R. Ramaswamy, "**Method to Accelerate Multi-Pattern Matching Over an Input String by Lookup in a Table of Fingerprints of Pattern-Prefixes**", US Patent Application Serial No: 11/481685, July 2006.

E. Bowen, P. Droz, C. Jeffries, L. Kencl, A. Kind, S. Mannal, R. Pletka, "**Flow Control in Network Devices**", US Patent Application Serial No: 10/325324, December 2002.

E. Bowen, P. Droz, L. Kencl, B. Metzler, "**Load Balancing in Data Networks**", European Patent Office Application No: 02014116.4, June 2002.

P. Droz, L. Kencl, "**Method and System for Processing Data Packets**", US Patent No: 7,020,153, filed: July 2001, issued: March 2006.

REFERENCES

Frank Binns
Director
Intel Research Laboratory
Cambridge, UK
<frank.binns@intel.com>

Prof. Jean-Yves Le Boudec
Ph.D. Advisor
Head of Institute of Communication Systems (ISC),
School of Computer and Communication Sciences (I&C),
EPFL, Lausanne
<jean-yves.leboudec@epfl.ch>

Hans Mulder, Ph.D.
Director, EU Research
Intel Research
<hans.mulder@intel.com>

Dr. Patrick Droz
Manager
Network Processor Software Group
Department of Systems
IBM Zurich Research Laboratory
<dro@zurich.ibm.com>

Prof. Martin LoebI
Department of Applied Mathematics
School of Computer Science
Charles University, Prague, Czech Republic
<loebI@kam.mff.cuni.cz>