Michio Honda

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INTERESTS

Computer Networks and Operating Systems

EDUCATION

Keio University, Tokyo, Japan

Ph.D. in Graduate School of Media and Governance, Cyber Informatics — Apr 2009 – Mar 2012
Thesis: The Internet is not an Internet—Principles, Evasion and Implications for Transport Protocols

M.S. in Graduate School of Media and Governance, Cyber Informatics — Apr 2007 – Mar 2009
Thesis: Bidimensional-Probe Multipath Congestion Control for Shared Bottleneck Fairness

B.S. in Faculty of Environment and Information Studies — Apr 2003 – Mar 2007
Thesis: Fast Transport Layer Handover Using Single Wireless Interface

WORK EXPERIENCE

Lecturer (Assistant Professor), School of Informatics, University of Edinburgh — Jan 2020 – present
Senior researcher, NEC Laboratories Europe, Heidelberg, Germany — Nov 2016 – Dec 2019
Software engineer, NetApp, Munich, Germany — Dec 2014 – Oct 2016
Research scientist, NEC Laboratories Europe, Heidelberg, Germany — Jul 2012 – Nov 2014

RESEARCH EXPERIENCE

Visiting student researcher, University College London (UCL), London, UK — Apr 2010 – Sep 2010
Advisor: Prof. Mark Handley
Focus: Middlebox, Multipath Transport Protocol.

Research intern, Nokia Research Center, Espoo, Finland — Jul 2008 – Jan 2009
Advisor: Dr. Lars Eggert
Focus: Multipath Transport Protocol.

AWARDS

Google Research Scholar Award * — Apr 2022
Facebook Research Award * — Aug 2021
Best paper award, ACM SOSR'15 * — Jun 2015
Community award, USENIX NSDI'12 — Apr 2012
IRTF/ISOC Applied Networking Research Prize (ANRP) * — Nov 2011
* as the sole recipient or lead author

SELECTED PROJECTS

Prism: Content-Aware Routing over TCP — NSDI'21
Prism enables content-aware routing of arbitrary-sized, encrypted application data over TCP, unlike the existing systems that rely on a custom UDP-based protocol. Prism modernizes the TCP handoff in the aid of programmable switches for robust operation and conformance to relevant features in recent Linux kernels.

PASTE: A Network Stack for Non-Volatile Main Memory — HotNets'21, NSDI'18, HotNets'16, ATC'16
PASTE is a network stack that offers unified abstractions of network and non-volatile main memory. It fills the gap between the storage and network stacks designed in isolation, and solves the problem with the costs of moving and transforming data between these stacks that are significant for non-volatile main memory that offers fast, byte-addressable persistence.

mSwitch: A Highly-Scalable, Modular Software Switch — SOSR'15, CCR'14, NSDI'14, SoCC'17
mSwitch solves the scalability problem of existing software switches that is crucial to consolidate a large number of VMs or virtualized network functions by a novel packet forwarding algorithm and streamlined data path. It was initially designed for ClickOS, a tiny unikernel that runs Click, and MultiStack, a framework that runs multiple user-space network stacks.

Middlebox Measurement for TCP Extensibility — IMC'11, NSDI'12
This work was motivated by exploring viable design of Multipath TCP. It transmits various non-existent TCP traffic that mimics possible future TCP extensions to our server and examines on-path actions to the packets. This is the first work that examines in-depth middlebox behaviour prevalent in the Internet.

PROFESSIONAL SERVICE

UNIVERSITY OF EDINBURGH
People and Culture committee — 2022–present
Programming Club, organizer — 2020–present

PROFESSIONAL SOCIETY
ACM SIGOPS, CARES Committee co-chair — 2023–present
IRTF ANRP Award Committee — 2022–present
ACM SIGOPS, CARES Committee — 2021–2022

CONFERENCE COMMITTEE

ACM SIGCOMM, Program Committee	2024
ACM ASPLOS, Program Committee	2024
USENIX NSDI, Program Committee	2023
USENIX ATC, Program Committee	2017, 2018 and 2020–2024
ACM HotStorage, Program Committee	2022–2024
USEINX OSDI, Preview Session (OS & Hardware)	2021
ACM/IEEE ANCS, Program Committee co-chair	2021
ACM CoNEXT, Program Committee	2021–2022
ACM EuroSys, Program Committee	2021 and 2024–2025
ACM EuroSys (Registration/Finance co-chair)	2021
ACM/IEEE SC, Program Committee	2019
ACM/IEEE ANCS, Program Committee	2018
ACM SOSR, Program Committee	2018
ACM EuroDW, Program Committee	2018
ACM/IEEE ToN, Reviewer	2017–2018
ACM SOSP poster, Program Committee	2013

TEACHING

Introduction to Programming (Informatics) Summer, University of Edinburgh	July 2021 and 2022
Computer Communications and Networks, University of Edinburgh	Spring 2021 and 2022, and fall 2022
Data Structures and Programming, Keio University	Fall 2011
Fundamentals of Information Technology, Keio University	Spring 2011

MENTORING

Xinshu Ma, primary PhD supervision, University of Edinburgh	Fall 2023
Tianyi Gao, primary PhD supervision, University of Edinburgh	Fall 2022
Tianyi Gao, MSc and intern supervision, University of Edinburgh	Spring 2022
Steven W. D. Chien, Postdoc supervision, University of Edinburgh	Spring 2022
Shuo Li, primary PhD supervision, University of Edinburgh	Fall 2021
Shinichi Awamoto, primary PhD supervision, University of Edinburgh	Spring 2021
Shinichi Awamoto, intern at NEC, Tokyo University	Fall 2019
Yutaro Hayakawa, MSc thesis intern at NEC, Keio University	Fall 2018
Nanako Momiyama, intern at NEC	Spring 2017
Kenichi Yasukata, mentor at NEC	Fall 2016
Nanako Momiyama, remote BSc thesis supervision, Keio University	Fall 2016
Yutaro Hayakawa, BSc thesis intern at NetApp, Keio University	Fall 2016
Kenichi Yasukata, MSc thesis intern at NetApp, Keio University	Fall 2015

GRANTS

GLOBAL

NetApp Faculty Fellowship, $50K, sole PI — Jan 2023
Towards Generic, Encrypted Datacenter Transport

Google Research Scholar Award, $60K, sole PI — May 2022
Upcycling Packets as Persistent In-Memory Data Structures

Facebook Research Award, $50K, sole PI — Nov 2021
Flexible transport scale-out with modern NICs

UK/EU

EPSRC New Investigator Award, £385K, sole PI — Apr 2022 – Mar 2025
NetPM: Co-designing Data Management and Networking Principles for Persistent Memory

NCSC RISE Proof-of-Concept, £45K, co-PI — Oct 2021 – Mar 2022
Follow on Project: Gupt - A Hardware Assisted Secure and Private Data Analytics

OTHER HONORS

Nominee for Teaching Award, Outstanding Course category, University of Edinburgh — Apr 2023

STUDENT SCHOLARSHIP

Research Fellowship for Young Scientists (DC1) — Apr 2009 – Mar 2012
Japan Society for the Promotion of Science, 9.2M JPY

Excellent Young Researcher Overseas Visit Program — Apr 2010
Japan Society for the Promotion of Science, 1M JPY

Young Leader Scholarship — Apr 2009
Keio University, 1M JPY

SELECTED PUBLICATIONS

Michio Honda, *"Packets as Persistent In-Memory Data Structures"*, ACM Workshop on Hot Topics in Networks (**HotNets**), Nov 2021.

Yutaro Hayakawa, **Michio Honda**, Douglas Santry and Lars Eggert, *"Prism: Proxies without the Pain"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Apr 2021.

Shinichi Awamoto, Erich Focht and **Michio Honda**, *"Designing a Storage Software Stack for Accelerators"*, USENIX Workshop on Hot Topics in Storage and File Systems (**HotStorage**), Jul 2020.

Maurice Bailleu, Jörg Thalheim, Pramod Bhatotia, Christof Fetzer, **Michio Honda** and Kapil Vaswani, *"Speicher:Securing LSM-based Key-Value Stores using Shielded Execution"*, USENIX Conference on File and Storage Technologies (**FAST**), Feb 2019.

Salvatore Pontarelli, Roberto Bifulco, Marco Bonola, Carmelo Cascone, Marco Spaziani, Valerio Bruschi, Davide Sanvito, Giuseppe Siracusano, Antonio Capone, **Michio Honda**, Felipe Huici and Giuseppe Bianchi, *"FlowBlaze: Stateful Packet Processing in Hardware"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Feb 2019.

Michio Honda, Giuseppe Lettieri, Lars Eggert and Douglas Santry, *"PASTE: A Network Programming Interface for Non-Volatile Main Memory"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Apr 2018.

Kenichi Yasukata, Felipe Huici, Vincenzo Maffione, Giuseppe Lettieri and **Michio Honda**, *"HyperNF: Building a High Performance, High Utilization and Fair NFV Platform"*, ACM Symposium on Cloud Computing (**SoCC**), Sep 2017.

Simon Kuenzer, Anton Ivanov, Filipe, Manco, Jose Mendes, Yuri Volchkov, Florian Schmidt, Kenichi Yasukata, **Michio Honda** and Felipe Huici, *"Unikernels Everywhere: The Case for Elastic CDNs"*, ACM International Conference on Virtual Execution Environments (**VEE**), Apr 2017.

Michio Honda, Lars Eggert and Douglas Santry, *"PASTE: Network Stacks Must Integrate with NVMM Abstractions"*, ACM Workshop on Hot Topics in Networks (**HotNets**), Nov 2016.

Kenichi Yasukata, **Michio Honda**, Douglas Santry and Lars Eggert, *"StackMap: Low-Latency Networking with the OS Stack and Dedicated NICs"*, USENIX Annual Technical Conference (**ATC**), Jun 2016.

Michio Honda, Felipe Huici, Giuseppe Lettieri and Luigi Rizzo, *"mSwitch: A Highly-Scalable, Modular Software Switch"*, ACM SIGCOMM Symposium on SDN Research (**SOSR**), Jun 2015. **Best paper award**

Michio Honda, Felipe Huici, Costin Raiciu, Joao Araujo and Luigi Rizzo, *"Rekindling Network Protocol Innovation with User-Level Stacks"*, ACM SIGCOMM Computer Communication Review (**CCR**), Apr 2014.

Joao Martins, Mohamed Ahmed, Costin Raiciu, Vladimir Olteanu, **Michio Honda**, Roberto Bifulco and Felipe Huici, *"ClickOS and the Art of Network Function Virtualization"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Apr 2014.

Costin Raiciu, Christoph Paasch, Sebastien Barre, Alan Ford, **Michio Honda**, Fabien Duchene, Olivier Bonaventure and Mark Handley, *"How Hard Can It Be? Designing and Implementing a Deployable Multipath TCP"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Apr 2012. **Community Award**

Michio Honda, Yoshifumi Nishida, Costin Raiciu, Adam Greenhalgh, Mark Handley and Hideyuki Tokuda, *"Is it Still Possible to Extend TCP?"* ACM Internet Measurement Conference (**IMC**), Nov 2011. **Applied Networking Research Prize**

Michio Honda, Yoshifumi Nishida, Pasi Sarolahti and Lars Eggert, *"Multipath Congestion Control for Shared Bottleneck"* International Workshop on Protocols for Future, Large-Scale & Diverse Network Transports (**PFLDNeT**), May 2008.

Michio Honda, Jin Nakazawa, Yoshifumi Nishida, Masahiro Kozuka and Hideyuki Tokuda, *"A Connectivity-Driven Retransmission Scheme Based On Transport Layer Readdressing"*, IEEE International Conference on Distributed Computing Systems (**ICDCS**), Jun 2008.

OPEN SOURCE CONTRIBUTION (by myself, not mentees)

PASTE	https://micchie.github.io/paste/
netmap	mSwitch and various features https://github.com/luigirizzo/netmap
MultiStack	https://github.com/sysml/multistack
Linux kernel	SCTP extensions https://www.kernel.org/
FreeBSD kernel	mSwitch and SCTP extensions https://www.freebsd.org/

[*CV compiled on 2023-10-28*]