Michio Honda

Room 1.02a, Informatics Forum, 10 Crichton Street, Edinburgh EH8 9AB, UK
michio.honda@ed.ac.uk • +44 (0)131 650 2710 • https://micchie.net

INTERESTS **Computer Networks and Operating Systems**

EDUCATION

Keio University, Tokyo Japan

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

M.S. in Graduate School of Media and Governance — Apr 2007 – Mar 2009
Program: Cyber Informatics
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 investigator or lead author

RECENT RESEARCH

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.

A Storage Stack for SoC-Based Accelerators — HotStorage'20
This work is motivated by the slow storage access in the applications that run in the PCIe-attached accelerator devices equipped with general-purpose CPU cores in addition to the specialized ones. It explores direct storage access architecture that bypasses the host CPUs, process or kernel, while providing useful abstractions to the applications.

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.

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.

COMMUNITY SERVICE

USENIX NSDI, Program Committee	2023
USENIX ATC, Program Committee	2017, 2018 and 2020–2023
ACM HotStorage, Program Committee	2022
USEINX OSDI, Preview Session (OS & Hardware)	2021
ACM/IEEE ANCS, Program Committee co-chair	2021
ACM CoNEXT, Program Committee	2021 and 2022
ACM EuroSys, Program Committee and 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

UNIVERSITY SERVICE

People and Culture, committee member — 2022–present
Programming Club, organizer — 2020–present

MENTORING

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 (exhaustive)

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

R&D COLLABORATIONS

Fed4IoT (H2020 No. 814918) — Jul 2018 – Dec 2020
The Federation for IoT (Fed4IoT) project aims at integrating heterogeneous IoT platforms and devices by virtualizing resources at multiple levels, including devices, platforms and information. Project volume is € 3 million in total.

SSICLOPS (H2020 No. 644866) — Feb 2014 – Jan 2018
The Scalable and Secure Infrastructures for Cloud Operations (SSICLOPS) focuses on cloud networking techniques in software-defined data centers and across wide-area networks. Project volume is € 7 million.

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

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 2023-03-05*]