

# Michio Honda

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<b>INTERESTS</b>	<b>Computer Networks and Operating Systems</b>	
<b>EDUCATION</b>	<b>Keio University</b> , Tokyo, Japan	
	<b>Ph.D.</b> in Graduate School of Media and Governance, Cyber Informatics Thesis: The Internet is not an Internet—Principles, Evasion and Implications for Transport Protocols	Apr 2009 – Mar 2012
	<b>M.S.</b> in Graduate School of Media and Governance, Cyber Informatics Thesis: Bidimensional-Probe Multipath Congestion Control for Shared Bottleneck Fairness	Apr 2007 – Mar 2009
	<b>B.S.</b> in Faculty of Environment and Information Studies Thesis: Fast Transport Layer Handover Using Single Wireless Interface	Apr 2003 – Mar 2007
<b>WORK EXPERIENCE</b>	<b>University of Edinburgh, School of Informatics</b> , Edinburgh, UK	
	<b>Reader</b> (Associate Professor)	Aug 2024 –
	<b>Lecturer in Networked Systems</b> (Assistant Professor)	Jan 2020 – Jul 2024
	<b>Senior researcher</b> , NEC Laboratories Europe, Heidelberg, Germany	Nov 2016 – Dec 2019
	<b>Software engineer</b> , NetApp, Munich, Germany	Dec 2014 – Oct 2016
	<b>Research scientist</b> , NEC Laboratories Europe, Heidelberg, Germany	Jul 2012 – Nov 2014
<b>OTHER EXPERIENCE</b>	<b>Visiting student researcher</b> , University College London (UCL), London, UK Advisor: Prof. Mark Handley Focus: Middlebox, Multipath Transport Protocol.	Apr 2010 – Sep 2010
	<b>Research intern</b> , Nokia Research Center, Espoo, Finland Advisor: Dr. Lars Eggert Focus: Multipath Transport Protocol.	Jul 2008 – Jan 2009
<b>AWARDS</b>	<b>Google Research Scholar Award</b> *	Apr 2022
	<b>Facebook Research Award</b> *	Aug 2021
	<b>Best paper award</b> , ACM SOSR'15 *	Jun 2015
	<b>Community award</b> , USENIX NSDI'12	Apr 2012
	<b>IRTF Applied Networking Research Prize (ANRP)</b> *	Nov 2011
	* as the sole recipient or lead author	
<b>SELECTED PROJECTS</b>	<b>Prism: Content-Aware Routing over TCP</b> 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.	
	<b>PASTE: A Network Stack for Non-Volatile Main Memory</b> 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.	
	<b>mSwitch: A Highly-Scalable, Modular Software Switch</b> 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.	
	<b>Middlebox Measurement for TCP Extensibility</b> 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.	
<b>PROFESSIONAL SERVICE</b>	<b>UNIVERSITY OF EDINBURGH</b>	
	People and Culture committee	2022–present
	Programming Club, organizer	2020–present
	<b>PROFESSIONAL SOCIETY</b>	
	ACM SIGOPS, CARES Committee co-chair	2023–present
	IRTF ANRP Award Committee	2022–present

ACM SIGOPS, CARES Committee 2021–2022

**CONFERENCE PROGRAM COMMITTEE**

ACM APSYS (2024), ACM HotNets (2024), ACM SIGCOMM (2024), ACM ASPLOS (2024), USENIX NSDI (2023), USENIX ATC (2017, 2018, 2020–2024), ACM HotStorage (2022–2024), ACM/IEEE ANCS (2018, 2021 (co-chair)), ACM CoNEXT (2021–2022), ACM EuroSys (2021, 2024–2025), ACM/IEEE SC (2019), ACM SOSR (2018), aCM EuroDW (2018, ACM/IEEE ToN (2017–2018), ACM SOSP poster (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**

**UNIVERSITY OF EDINBURGH**

Eugenio Luo, Internship, EPSRC Vacation Internship project mentor Summer 2024  
Xinshu Ma, primary PhD supervision Fall 2023  
Tianyi Gao, primary PhD supervision Fall 2022  
Tianyi Gao, MSc and intern supervision Spring 2022  
Steven W. D. Chien, Postdoc supervision Spring 2022  
Shuo Li, primary PhD supervision Fall 2021  
Shinichi Awamoto, primary PhD supervision Spring 2021

**NETAPP**

Nanako Momiyama, 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

**NEC LABS EUROPE**

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

**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.

<b>OPEN SOURCE CONTRIBUTION</b> (by myself, not mentees)	PASTE netmap MultiStack Linux kernel FreeBSD kernel	<a href="https://micchie.github.io/paste/">https://micchie.github.io/paste/</a> mSwitch and various features <a href="https://github.com/luigirizzo/netmap">https://github.com/luigirizzo/netmap</a> <a href="https://github.com/sysml/multistack">https://github.com/sysml/multistack</a> SCTP extensions <a href="https://www.kernel.org/">https://www.kernel.org/</a> mSwitch and SCTP extensions <a href="https://www.freebsd.org/">https://www.freebsd.org/</a>
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