

# Tomoyuki Aotani

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Born: March 4, 1982—Osaka, Japan

Nationality: Japan

## Current position

*Assistant Professor*, Department of Mathematical and Computing Science, School of Computing, Tokyo Institute of Technology, Japan

## Areas of specialization

Computer Science; Design and Implementation of Programming Languages for Advanced Modularity.

## Appointments held

- 2013-2016 Assistant Professor, Department of Mathematical and Computing Sciences, Tokyo Institute of Technology, Japan
- 2010-2013 Assistant Professor, Japan Advanced Institute of Technology, Japan
- 2009-2010 JSPS Research fellow (DC2), the University of Tokyo, Japan

## Education

- 2004 BSc, Faculty of Computer and Information Sciences, Hosei University, Japan
- 2006 M.A., Graduate School of Arts and Sciences, the University of Tokyo, Japan
- 2009 Ph.D., Graduate School of Arts and Sciences, the University of Tokyo, Japan

## Grants, honors & awards

### GRANTS

- 2019–2021 JSPS KAKENHI Grant Number 19K11898
- 2016–2018 JSPS KAKENHI Grant Number 16K16033
- 2011–2014 JSPS KAKENHI Grant Number 23700033
- 2008–2009 JSPS KAKENHI Grant Number 08J11378

### AWARDS

- 2018 Distinguished Artifact Award, “ContextWorkflow: A Monadic DSL for Compensable and Interruptible Executions”, ECOOP 2018
- 2015 Best paper award from JSSST (Japan Society for Software Science and Technology)
- 2009 Ichiko-Award from the University of Tokyo

## Publications

### JOURNAL ARTICLES (REFEREED)

- 2018 Tetsuo Kamina, Tomoyuki Aotani, Hidehiko Masuhara and Atsushi Igarashi. “Method Safety Mechanism for Asynchronous Layer Deactivation Science of Computer Programming”, Science of Computer Programming, pages 104-120.
- 2018 Tetsuo Kamina and Tomoyuki Aotani. “Harmonizing Signals and Events with a Lightweight Extension to Java”, The Art, Science, and Engineering of Programming, Vol.2, No.3, Article 5, 29 pages.
- 2016 Tetsuo Kamina, Tomoyuki Aotani, and Hidehiko Masuhara, “Generalized Layer Activation Mechanism for Context-Oriented Programming”, LNCS Transactions on Modularity and Composition, Volume 9800 of LNCS, pages 123-166.
- 2016 Tetsuo Kamina, Tomoyuki Aotani, Hidehiko Masuhara and Tetsuo Tamai. “Context-Oriented Software Development with Generalized Layer Activation Mechanism”, LNCS Transactions on Modularity and Composition, Volume 9800 of LNCS, pages 3-40.
- 2016 Izumi Asakura, Hidehiko Masuhara and Tomoyuki Aotani. “Proof of Soundness of Concurrent Separation Logic for GPGPU in Coq”, Journal of Information Processing Vol.24(2016), No. 1, pages 132–140.
- 2013 Tomoyuki Aotani, Tetsuo Kamina and Hidehiko Masuhara. “EventCJ: a context-oriented language with declarative per-object layer transitions”, Computer Software (JSSST journal), Vol.30, No.3, pages 130-147 (in Japanese).
- 2013

- Tetsuo Kamina, Tomoyuki Aotani and Hidehiko Masuhara. “Introducing composite layers in EventCJ”, *IPSJ Transaction on Programming*, Vol.6, No.1, pp.1-8.
- 2009 Tomoyuki Aotani and Hidehiko Masuhara. “Towards a type System for safe execution of AspectJ advice”, *Computer Software (JSSST journal)*, Vol.26(2), pp170-182 (in Japanese).
- 2006 Tomoyuki Aotani and Hidehiko Masuhara. “A compilation framework for aspect-oriented programs with pointcuts using user-defined program analysis”, *Computer Software (JSSST journal)*, Vol.23(2), pp157-167 (in Japanese).
- CONFERENCE & WORKSHOP PAPER (REFERRED)
- 2018 Akio Oka, Hidehiko Masuhara, and Tomoyuki Aotani. “Live, Synchronized, and Mental Map Preserving Visualization for Data Structure Programming”, *Proceedings of the 2018 ACM SIGPLAN International Symposium on New Ideas, New Paradigms, and Reflections on Programming and Software*, pages 72-87.
- 2018 Yudai Tanabe, Tomoyuki Aotani, and Hidehiko Masuhara. “A Context-Oriented Programming Approach to Dependency Hell”, *Proceedings of the 10th International Workshop on Context-Oriented Programming: Advanced Modularity for Run-time Composition*, pages 8-14.
- 2018 Hiroaki Inoue, Tomoyuki Aotani, and Atsushi Igarashi. “ContextWorkflow: A Monadic DSL for Compensable and Interruptible Executions”, *32nd European Conference on Object-Oriented Programming (ECOOP 2018)*, pages 2:1-2:33.
- 2017 Hiroaki Inoue, Tomoyuki Aotani, and Atsushi Igarashi. “A DSL for Compensable and Interruptible Executions”, *Proceedings of the 4th International workshop on Reactive and Event-based Languages & Systems (REBLS)*, pages 8-14.
- 2017 Tetsuo Kamina, Tomoyuki Aotani, and Hidehiko Masuhara. ”Push-based Reactive Layer Activation in Context-Oriented Programming”, *Proceedings of Context-Oriented Programming (COP’17)*, pages 17-21.
- 2017 Akio Oka, Hidehiko Masuhara, Tomoki Imai, and Tomoyuki Aotani. “Live Data Structure Programming”, *Proceedings of Programming 2017*, Article No. 26, 7 pages.
- 2017 Izumi Asakura, Hidehiko Masuhara, and Tomoyuki Aotani. ”CertSkel: a Verified Compiler for a Coq-embedded GPGPU DSL”, *Proceedings of The Third International Workshop on Coq for Programming Languages (CoqPL 2017)*.
- 2016 Tomoyuki Aotani and Tetsuo Kamina, ”Towards Automatic Decoration”, *Proceedings of the -1th Workshop on New Object-Oriented Languages (NOOL)*, Article No. 2.
- 2016

- Gary T. Leavens, David A. Naumann, Hridesh Rajan, and Tomoyuki Aotani. “Specifying and Verifying Advanced Control Features”, *Leveraging Applications of Formal Methods, Verification and Validation: Discussion, Dissemination, Applications - 7th International Symposium (ISoLA 2016)*, ISoLA (2) 2016, pages 80–96.
- 2016 Tomoyuki Aotani and Gary T. Leavens, “Towards Modular Reasoning for Context-Oriented Programs”, *Proceedings of the 18th Workshop on Formal Techniques for Java-like Programs (FTfJP’16)*, Article No.8.
- 2016 Hirotada Kiriyama, Tomoyuki Aotani, Hidehiko Masuhara. ”A lightweight optimization technique for data types á la carte”, *Proceedings of workshop on Language Modularity Á La Mode Workshop (LaMOD’16)*, MODULARITY Companion 2016: Companion Proceedings of the 15th International Conference on Modularity, pages. 86-90.
- 2016 Hidehiko Masuhara, Kenta Fujita and Tomoyuki Aotani. ”An advice mechanism for non-local flow control”, *Proceedings of workshop on Foundations of Aspect-Oriented Languages (FOAL2016)*, MODULARITY Companion 2016: Companion Proceedings of the 15th International Conference on Modularity, pages 73-78.
- 2016 Tetsuo Kamina, Tomoyuki Aotani and Hidehiko Masuhara. ”Toward fluent module interactions”, *Proceedings of Workshop on Modularity Across the System Stack (MASS 2016)*, MODULARITY Companion 2016: Companion Proceedings of the 15th International Conference on Modularity, pages 158-159.
- 2015 Tomoyuki Aotani, Tetsuo Kamina and Hidehiko Masuhara. ”Type-Safe Layer-Introduced Base Functions with Imperative Layer Activation”, *Proceedings of Context-Oriented Programming (COP’15)*, Article No.8.
- 2015 Tetsuo Kamina, Tomoyuki Aotani, Atsushi Igarashi and Hidehiko Masuhara. ”Method Safety Mechanism for Asynchronous Layer Deactivation”, *Proceedings of Context-Oriented Programming (COP’15)*, Article No.6.
- 2015 Tetsuo Kamina, Tomoyuki Aotani and Hidehiko Masuhara. ”Generalized Layer Activation Mechanism Through Contexts and Subscribers”, *Proceedings of International Conference on Modularity (MODULARITY’15)*, pages 14-28.
- 2014 Tomoyuki Aotani, Tetsuo Kamina and Hidehiko Masuhara. “Unifying Multiple Layer Activation Mechanisms Using One Event Sequence”, *Proceedings of international workshop on Context-Oriented Programming (COP’14)*, Article No.2.
- 2014 Tetsuo Kamina, Tomoyuki Aotani, and Atsushi Igarashi. “On-Demand Layer Activation for Type-Safe Deactivation”, *Proceedings of Context-Oriented Programming (COP’14)*, Article No.4.
- 2014

- Naoya Murakami, Hidehiko Masuhara, and Tomoyuki Aotani. “Code recommendation based on a degree-of-interest model”, *Proceedings of international workshop on Recommendation Systems in Software Engineering (RSSE 2014)*, pp.28–29.
- 2014 Tomoyuki Aotani, Tetsuo Kamina, and Hidehiko Masuhara. “Context holders: realizing multiple layer activation mechanisms in a single context-oriented language”, *Proceedings of international workshop on Foundations of Aspect-Oriented Languages (FOAL’14)*, pp.3–6.
- 2014 Tetsuo Kamina, Tomoyuki Aotani, Hidehiko Masuhara, and Tetsuo Tamai. “Context-Oriented Software Engineering: A Modularity Vision”, *Proceedings of international conference on Modularity (MODULARITY’14)*, pp.85–98. 2014.
- 2013 Tetsuo Kamina, Tomoyuki Aotani, and Hidehiko Masuhara. “A unified context activation mechanism”, *Proceedings of international workshop on Context-Oriented Programming (COP’13)*, Article No.2.
- 2013 Tetsuo Kamina, Tomoyuki Aotani, and Hidehiko Masuhara. “A core calculus of composite layers”, *Proceedings of international workshop on Foundations of Aspect-Oriented Languages (FOAL’13)*, pp.7–12.
- 2013 Takeshi Kojima and Tomoyuki Aotani. “Hierarchical concern-based pointcuts”, *Proceedings of international workshop on advanced modularization techniques (AOAsia’13)*, pp.19–22.
- 2013 Lin Wang, Tomoyuki Aotani and Masato Suzuki, “Feature selection for clustering based aspect mining”, *Proceedings of international workshop on Variability & Composition (VariComp’13)*, pp.7–12.
- 2012 Tetsuo Kamina, Tomoyuki Aotani and Hidehiko Masuhara. “Bridging real-world contexts and units of behavioral variations by composite layers”, *Proceedings of international workshop on Context-Oriented Programming (COP’12)*, pp.1–6.
- 2012 Manabu Toyama, Tomoyuki Aotani and Hidehiko Masuhara, “A per-type instantiation mechanism for generic aspects”, *Proceedings of international workshop on Variability & Composition (VariComp’12)*, pp.25–30.
- 2011 Tetsuo Kamina, Tomoyuki Aotani and Hidehiko Masuhara. “EventCJ: A Context-Oriented Programming Language with Declarative Event-based Context Transition”, *Proceedings of international conference on Aspect-Oriented Software Development (AOSD 2011)*, pp.253–264.
- 2011 Tomoyuki Aotani, Tetsuo Kamina and Hidehiko Masuhara. “Featherweight EventCJ: a core calculus for a context-oriented language with event-based per-instance layer transition”, *Proceedings of international workshop on Context-Oriented Programming (COP’11)*, pp.1–7.

- 2011 Fan Yang, Hidehiko Masuhara, Tomoyuki Aotani, Flemming Nielson, and Hanne Riis Nielson. “Combining static analysis and runtime checking in security aspects for distributed tuple spaces”, *Proceedings of international conference on Coordination models and languages (COORDINATION’11)*, pp.202–218.
- 2010 Tetsuo Kamina, Tomoyuki Aotani and Hidehiko Masuhara. “Designing Event-based Context Transition in Context-oriented Programming”. In Proceedings of the 2nd International Workshop on Context-oriented Programming 2010 (COP’10), pp.1–6.
- 2010 Fan Yang, Hidehiko Masuhara, Tomoyuki Aotani, Flemming Nielson and Hanne Riis Nielson. “AspectKE\*: Security Aspects with Program Analysis for Distributed Systems”. In Proceedings of Aspects, Components, and Patterns for Infrastructure Software (ACP4IS’10), pp.27–31
- 2010 Tomoyuki Aotani, Manabu Touyama and Hidehiko Masuhara. “StrongRelaxAJ: integrating adaptability of RelaxAJ and expressiveness of StrongAspectJ”. *Foundations of Aspect-Oriented Languages (FOAL2010)*, pp.1–4.
- 2009 Tomoyuki Aotani and Hidehiko Masuhara. “A Join Point Model for Implicit Conversion”. In Proceedings of the 5th Asian Workshop on Aspect-Oriented Software Development (AOAsia 5), pp.35–37.
- 2007 Tomoyuki Aotani and Hidehiko Masuhara. “Towards a type system for detecting never-matching pointcut compositions”. In Proceedings of the 6th workshop on Foundations of Aspect-Oriented Languages, pp.23-26.
- 2007 Tomoyuki Aotani and Hidehiko Masuhara. “SCoPE: an AspectJ compiler for supporting user-defined analysis-based pointcuts”. In Proceedings of the 6th International Conference on Aspect-Oriented Software Development, pp.161-172.
- 2006 Hidehiko Masuhara and Tomoyuki Aotani. “Issues on Observing Aspect Effects from Expressive Pointcuts”, the 20th European Conference on Object-Oriented Programming (ECOOP2006) workshop on Aspects, Dependencies and Interactions, pp.53-61.
- 2005 Tomoyuki Aotani and Hidehiko Masuhara. “Compiling Conditional Pointcuts for User-Level Semantic Pointcuts”, Workshop on Software-engineering Properties of Languages and Aspect Technologies (SPLAT ’05).

## Teaching

- 2011–2012 “Data structures and algorithms” (I111) in JAIST
- 2013– “Introduction to Computer Science” in Tokyo Institute of Technology
- Present “Programming II” in Tokyo Institute of Technology
- Present

2016–  
Present  
2016–  
Present  
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Present  
Present

“Forum on Mathematical and Computing Science S<sub>3</sub>” in Tokyo Institute of Technology  
“Forum on Mathematical and Computing Science S<sub>4</sub>” in Tokyo Institute of Technology  
“Forum on Mathematical and Computing Science F<sub>3</sub>” in Tokyo Institute of Technology  
“Forum on Mathematical and Computing Science F<sub>4</sub>” in Tokyo Institute of Technology

## Service to the profession

- REBLS’19, PC member
- Editorial board member, Special issues on “Programming and Programming Languages”, JSSST, 2019–Present
- PPL2019, PC member
- REBLS’18, PC member
- COP’18, PC member
- COP’17, PC member
- Editorial committee member, Journal of Information Processing, IPSJ, 2017–Present
- Editorial committee member, Journal of Computer Software, JSSST, 2016–Present
- JSSST Taikai 2017, PC member
- PPL2017, PC member
- JSSST Taikai 2016, Demonstrations & Posters Chair
- COP’16, PC member
- COP’15, PC member
- AOAsia/Pacific’14, Organizing chair
- COP’14, Organizing chair
- COP’13, PC member
- AOAsia/Pacific’13, Organizer & PC member
- AOSD’13, Workshop Co-chair
- PPL2013, PC member
- FOAL2012, PC member
- DSL’11, External reviewer
- AOAsia/Pacific’11, Organizer & PC member

- COP'11, External reviewer
- AOAsia6 (2010), General chair
- IPSJ SIG-SE Organizing committee member (2011–2013)
- AOAsia/Pacific'10, Organizer
- DSL(Dynamic Languages Symposium)'10, External reviewer
- AOSD'10, External reviewer
- AOSD'09 Spring School, Teaching Assistant
- AOSD'09, External reviewer
- AOSD'08, Student volunteer
- AOSD'08, External reviewer
- APLAS'07, External reviewer
- AOSD'07, External reviewer
- APSEC'07, External reviewer
- AOSD'06, External reviewer