

# Thomas Laurent

POSTDOCTORAL RESEARCH FELLOW IN SOFTWARE ENGINEERING

✉ thomas-laurent@nii.ac.jp | 📧 LaurentTho3 | 📞 Thomas Laurent | 🌐 Thomas Laurent

## Education

### PhD in Computer Science

UNIVERSITY COLLEGE DUBLIN

Dublin, Ireland

2017 - 2021

- **Thesis:** "Assessing, improving, and expanding mutation analysis"
- Designed, implemented, and evaluated methods for the efficient assessment of test suite quality
- Implemented methods for mutation analysis in different contexts, including continuous integration, and autonomous vehicle testing

### Master of Science in Computer Science

KEIO UNIVERSITY

Kanagawa, Japan

2015 - 2017

- Double degree program with Ecole Centrale de Nantes

### Bachelor and Master of Science and Engineering

ECOLE CENTRALE DE NANTES

Nantes, France

2013 - 2015

- General Engineering with major in IT

## Work Experience

### Postdoctoral Research Fellow

JAPANESE SOCIETY FOR THE PROMOTION OF SCIENCE @ NATIONAL INSTITUTE OF INFORMATICS

Tokyo, Japan

Jan 2023 - Dec 2023

- Part of the Engineerable AI Project, working with a network of researchers and industry partners across Japan and internationally
- Working on repair of Deep Neural Networks, and testing and understating of Smart Systems

### Postdoctoral Research Fellow

UNIVERSITY COLLEGE DUBLIN & LERO

Dublin, Ireland

Sep 2021 - Dec 2022

- Co-PI of a successful grant application for a 4 year long project totalling over €150K of funding
- Research manager of a project in collaboration with Fidelity Investments involving a team of 5 students (€50K of funding)

### Lecturer

UNIVERSITY COLLEGE DUBLIN

Dublin, Ireland

Sep 2022 - Dec 2022

- Delivered module COMP20070 Databases and Information Systems I to a class of 178 students

### Teaching assistant and demonstrator

UNIVERSITY COLLEGE DUBLIN

Dublin, Ireland

Sep 2017 - Sep 2021

- Coordinating a team of demonstrators for modules of around 100 students as Teaching Assistant. (Operating Systems, Software Engineering)
- Participating in the design and production of course material. (Operating Systems, Programming for Big Data)
- Guiding students through courses as a demonstrator for several modules. (Text Analytics, Software Engineering, Programming for Big Data)

### Research intern

FIDELITY INVESTMENTS

Dublin, Ireland

June 2020 - December 2020

- Designed, implemented, and deployed a mutation tool for database stored procedures
- Collaborated with a team of developers and quality assessment engineers to define business needs and design the best user experience
- This work led to patent number 11409641

### Senior Lecturer

UNIVERSITY OF THE PHILIPPINES OPEN UNIVERSITY

Los Baños, Philippines - remote

Sept. 2018 - 2020

- Designed and delivered an online module on database management systems (~50 students/year)

### Research intern

NATIONAL INSTITUTE OF INFORMATICS

Tokyo, Japan

Feb. 2019 - Aug. 2019

- Developed a mutation analysis technique and tool for an autonomous vehicle's path planning module
- Worked as part of a diverse and international team in the ERATO MMSD project

### Research intern

MICROSOFT SKYPE / UNIVERSITY COLLEGE DUBLIN

Dublin, Ireland

Apr. 2015 - Aug. 2015

- Extended the Pitest mutation tool's mutation operator set
- Developed a web tool to facilitate brainstorming in online meetings

## Skills

**Languages** French (*native speaker*), English (*native level*), Japanese (*conversational*)  
**Programming** Java, SQL, Bash, Python, C

## Honors & Awards

2023 **Lero Director's Prize for PhD/Postdoc Researcher contribution**, Lero, the SFI Research Centre for Software *Ireland*  
2022 **Best Paper Award**, 17th International Workshop on Mutation Analysis- Co-located with ICST *Virtual*  
2017 - 2021 **Government of Ireland Postgraduate Scholarship**, PhD program fully funded by the Irish Research Council *Ireland*  
2020 **IEEE TCSE Distinguished Paper Award**, International Conf. on Software Maintenance and Evolution (ICSME) *Virtual*  
2020 **Best Paper Award**, 15th International Workshop on Mutation Analysis- Co-located with ICST *Virtual*  
2015 - 2017 **Monbukagakusho (MEXT) Postgraduate Student Scholarship**, Fully funded master's degree *Japan*

## Reviewing and organisation activities

2024 **Mutation Workshop**, Co-chair *Toronto, Canada*  
**International Conference on Software Testing, Verification and Validation (ICST)**,  
2023

- Web chair *Dublin, Ireland*
- Research papers track reviewer

  
2020, 2023 **Software Testing, Verification and Reliability (STVR)**, Reviewer  
2023 **International Conference on Model-Driven Engineering Languages and Systems (MODELS)**,  
Sub-reviewer  
2022 **IEEE Transaction on Software Engineering (TSE)**, Reviewer  
2022 **International Conference on Software Testing, Verification and Validation (ICST)**, Posters track reviewer

## Publications and presentations

### Adaptive Search-based Repair of Deep Neural Networks

D LI CALSI, M DURAN, **T LAURENT**, X ZHANG, P ARCAINI, F ISHIKAWA

- Full Paper, presented
- Genetic and Evolutionary Computation Conference (GECCO)

*Lisbon*

2023

### JSIMutate: understanding performance results through mutations

**T LAURENT**, P ARCAINI, C TRUBIANI, A VENTRESQUE

- Tool Paper, presented
- 30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)

*Singapore*

2022

### On the use of commit-relevant mutants

M OJDANIĆ, W MA, **T LAURENT**, TT CHEKAM, A VENTRESQUE, M PAPADAKIS

- Journal Paper
- Empirical Software Engineering (ESE)

2022

### Mutation-based analysis of queueing network performance models

**T LAURENT**, P ARCAINI, C TRUBIANI, A VENTRESQUE

- Journal Paper
- Journal of Systems and Software (JSS)
- Presented at the Journal First track of the 37th IEEE/ACM International Conference on Automated Software Engineering (ASE)

2022

### The case for grammatical evolution in test generation

A MURPHY, **T LAURENT**, A VENTRESQUE

- Full Paper
- 11th International Workshop on Genetic Improvement, Genetic and Evolutionary Computation Conference (GECCO)

*Boston, USA*

2022

### The forgotten margins of AI ethics

A BIRHANE, E RUANE, **T LAURENT**, M S. BROWN, J FLOWERS, A VENTRESQUE, C L. DANCY

- Full Paper
- ACM Conference on Fairness, Accountability, and Transparency (FAccT)

*Seoul, S. Korea*

2022

### Re-visiting the coupling between mutants and real faults with Defects4J 2.0

**T LAURENT**, S GAFFNEY, A VENTRESQUE

- Full Paper, presented
- 17th International Workshop on Mutation analysis, IEEE International Conference on Software Testing, Verification and Validation (ICSTW)

*Virtual*

2022

## Parameter Coverage for Testing of Autonomous Driving Systems Under Uncertainty

T LAURENT, S KLIKOVITS, P ARCAINI, F ISHIKAWA, A VENTRESQUE

2022

- Journal Paper
- ACM Transactions on Software Engineering and Methodology (TOSEM)
- Presented at the Journal First track of the IEEE/ACM International Conference on Software Engineering (ICSE 2023)

## Shake Those System Parameters! On the Need for Parameter Coverage for Decision Systems

Virtual

T LAURENT, P ARCAINI, F ISHIKAWA, A VENTRESQUE

2021

- NIER Paper
- 36th IEEE/ACM International Conference on Automated Software Engineering (ASE)

## Parameter-Based Testing and Debugging of Autonomous Driving Systems

Virtual

P ARCAINI, A CALÒ, F ISHIKAWA, T LAURENT, X ZHANG, S ALI, F HAUSER, A VENTRESQUE

2021

- Full Paper
- IEEE Intelligent Vehicles Symposium Workshops (IV Workshops)

## Achieving Weight Coverage for an Autonomous Driving System with Search-based Test Generation (HOP track at GECCO 2021)

Virtual

T LAURENT, P ARCAINI, F ISHIKAWA, A VENTRESQUE

2021

- HOP Paper
- Genetic and Evolutionary Computation Conference

## Achieving Weight Coverage for an Autonomous Driving System with Search-based Test Generation

Virtual

T LAURENT, P ARCAINI, F ISHIKAWA, A VENTRESQUE

2020

- Full Paper
- 25<sup>th</sup> International Conference on Engineering of Complex Computer Systems (ICECCS)

## On the Impact of Timeouts and JVM Crashes in Pitest

Virtual

T LAURENT, F WALL, A VENTRESQUE

2020

- Full Paper, presented
- 15<sup>th</sup> International Workshop on Mutation analysis, IEEE International Conference on Software Testing, Verification and Validation (ICSTW)

## Commit-Aware Mutation Testing

Virtual

W MA, T LAURENT, M OJDANIĆ, TT CHEKAM, A VENTRESQUE, M PAPADAKIS

2020

- Full Paper
- 36<sup>th</sup> International Conference on Software Maintenance and Evolution (ICSME)

## A Mutation-based Approach for Assessing Weight Coverage of a Path Planner

Putrajaya, Malaysia

T LAURENT, P ARCAINI, F ISHIKAWA, A VENTRESQUE

2019

- Full Paper, presented
- 26<sup>th</sup> Asia-Pacific Software Engineering Conference (APSEC)

## PIT-HOM: an Extension of Pitest for Higher Order Mutation Analysis

Xian, China

T LAURENT, A VENTRESQUE

2019

- Full Paper, presented
- 14<sup>th</sup> International Workshop on Mutation analysis, IEEE International Conference on Software Testing, Verification and Validation (ICSTW)

## Deployment Strategies for Crowdsourcing Text Creation

RM BORROMEO, T LAURENT, M TOYAMA, MA ALSAYASNEH, S AMER-YAHIA, V LEROY

2017

- Journal Paper, impact factor 2.066 (2018)
- Information Systems, Volume 71, Pages 103-110

## RTA: a Framework For the Integration of Local and Relational Open Data

Bristol, UK

Y KOSAKA, S MURAKAMI, T LAURENT, K GOTO, M TOYAMA

2017

- Full Paper
- 21<sup>st</sup> International Database Engineering & Applications Symposium (IDEAS)

## Towards a Gamified Equivalent Mutants Detection Platform

Tokyo, Japan

T LAURENT, L GUILLOT, M TOYAMA, R SMITH, D BEAN, A VENTRESQUE

2017

- Poster Paper, presented
- 10<sup>th</sup> IEEE International Conference on Software Testing, Verification and Validation (ICST)

## Assessing and Improving the Mutation Testing Practice of PIT

Tokyo, Japan

T LAURENT, M PAPADAKIS, M KINTIS, C HENARD, Y LE TRAON, A VENTRESQUE

2017

- Short Paper, presented
- 10<sup>th</sup> IEEE International Conference on Software Testing, Verification and Validation (ICST)

### **Fairness and Transparency in Crowdsourcing.**

RM BORROMEO, **T LAURENT**, M TOYAMA, S AMER-YAHIA

- Poster Paper, presented
- 20<sup>th</sup> International Conference on Extending Database Technology (EDBT)

*Venice, Italy*

2017

### **PIT: a Practical Mutation Testing Tool for Java**

H COLES, **T LAURENT**, C HENARD, M PAPADAKIS, A VENTRESQUE

- Tool Demonstration
- 25<sup>th</sup> International Symposium on Software Testing and Analysis (ISSTA)

*Saarbrücken, Germany*

2016

### **The Influence of Crowd Type and Task Complexity on Crowdsourced Work Quality**

RM BORROMEO, **T LAURENT**, M TOYAMA

- Full Paper
- 20<sup>th</sup> International Database Engineering & Applications Symposium (IDEAS)

*Montreal, Canada*

2016