

Tom de Jong · Curriculum Vitae

School of Computer Science
University of Nottingham
NG8 1BB Nottingham
United Kingdom

Email: tom.dejong@nottingham.ac.uk
Homepage: <https://tdejong.com>

Born: April 26, 1994—Rotterdam, The Netherlands
Nationality: Dutch (The Netherlands)

Current position

Research Fellow (postdoc), School of Computer Science, University of Nottingham, UK (October 2022–present)
Supervisor: Dr. Nicolai Kraus

Research interests

I am interested in the foundations of mathematics, mathematical logic and its applications to theoretical computer science. Specifically, I have worked on category theory, constructive mathematics, domain theory, homotopy type theory, topology and proof assistants.

Education

PhD in *Theoretical Computer Science*, University of Birmingham, UK (2018–2022)
Supervisor: Prof. Martín Hötzel Escardó, co-supervisor: Dr. Benedikt Ahrens
Title: *Domain Theory in Constructive and Predicative Univalent Foundations*
Supported by the **Dissertation Fellowship in Homotopy Type Theory** (see next section). [arXiv:2301.12405](https://arxiv.org/abs/2301.12405)

MSc in *Mathematical Sciences*, Utrecht University, The Netherlands (2015–2018)
GPA: 4.00 (*cum laude*)

BSc in both *Computer Science* and *Mathematics*, Utrecht University, The Netherlands (2012–2015)
GPA: 4.00 (*cum laude*)

Awards & fellowships

Award for the **Best Paper by a Junior Researcher** at *6th International Conference on Formal Structures for Computation and Deduction (FSCD 2021)*. Item [c2] under *Publications*.

Dissertation Fellowship in Homotopy Type Theory, funded by Cambridge Quantum Computing and Ilyas Khan, 18,000 USD.

Committee members: Prof. Steve Awodey, Prof. Thierry Coquand, Prof. Emily Riehl and Dr. Mike Shulman. 2021. <https://tinyurl.com/hott-dissertation>.

Competitive college (faculty) level financial award for **outstanding performance** as a teaching assistant in the (*Advanced*) *Functional Programming* modules, *University of Birmingham*, UK. 2022.

Excerpts from the nomination quotes of the lecturers:

Tom always worked above and beyond what is required in all his duties. He produced, with the help of other TA's, automatic marking scripts to verify the correctness of students' computer programs. This is very difficult to do, and very time consuming, and, more importantly, requires a high amount of creativity and commitment.

Tom has shown an absolute mastery of the material through his construction of exercise sheets and test material, his interaction with students and his ability to identify and even anticipate issues. He has been instrumental in resolving marking issues, taking the lead among the PGTA's. I feel like his experience and insights contributed massively to a successful module.

Publications

ARTICLES IN REFEREED JOURNALS

[j1] Tom de Jong. “The Scott model of PCF in univalent type theory”. *Mathematical Structures in Computer Science (MSCS)*, 31(10): *Homotopy Type Theory 2019*, pp. 1270–1300. 2021. [doi:10.1017/S0960129521000153](https://doi.org/10.1017/S0960129521000153)

[j2] Tom de Jong and Jaap van Oosten. “The Sierpinski Object in the Scott Realizability Topos”. *Logical Methods in Computer Science (LMCS)*, 16(3):12:1–12:16. 2020. [doi:10.23638/LMCS-16\(3:12\)2020](https://doi.org/10.23638/LMCS-16(3:12)2020)

ARTICLES IN REFEREED CONFERENCE PROCEEDINGS

[c1] Tom de Jong. “Sharp Elements and Apartness in Domains”. In A. Sokolova (ed.) *37th Conference on Mathematical Foundations of Programming Semantics*

(*MFPS 2021*), volume 351 of *Electronic Proceedings in Theoretical Computer Science (EPTCS)*, pp. 134–151. Open Publishing Association. 2021. [doi:10.4204/EPTCS.351.9](https://doi.org/10.4204/EPTCS.351.9).

[c2] Tom de Jong and Martín Hötzel Escardó. “Predicative Aspects of Order Theory in Univalent Foundations” In N. Kobayashi (ed.) *6th International Conference on Formal Structures for Computation and Deduction (FSCD 2021)*, volume 195 of *Leibniz International Proceedings in Informatics (LIPIcs)*, pp. 8:1–8:18. Schloss Dagstuhl–Leibniz-Zentrum für Informatik. 2021. [doi:10.4230/LIPIcs.FSCD.2021.8](https://doi.org/10.4230/LIPIcs.FSCD.2021.8).

[c3] Tom de Jong and Martín Hötzel Escardó. “Domain Theory in Constructive and Predicative Univalent Foundations”. In C. Baier and J. Goubault-Larrecq (eds.) *29th EACSL Annual Conference on Computer Science Logic (CSL 2021)*, volume 183 of *Leibniz International Proceedings in Informatics (LIPIcs)*, pp. 28:1–28:18. Schloss Dagstuhl–Leibniz-Zentrum für Informatik. 2021. [doi:10.4230/LIPIcs.CSL.2021.28](https://doi.org/10.4230/LIPIcs.CSL.2021.28)

PREPRINTS

[p1] Tom de Jong, Nicolai Kraus, Fredrik Nordvall Forsberg and Chuangjie Xu. “Set-Theoretic and Type-Theoretic Ordinals Coincide”. 2023. [arXiv:2301.10696](https://arxiv.org/abs/2301.10696)

[p2] Tom de Jong and Martín Hötzel Escardó. “On Small Types in Univalent Foundations”. Extended version of [c2]. 2022. [arXiv:2111.00482](https://arxiv.org/abs/2111.00482)

Submitted upon invitation to the special issue of *Logical Methods in Computer Science (LMCS)* for selected papers from *FSCD 2021*.

[p3] Tom de Jong. “Sharp Elements and the Scott Topology of Continuous Dcpos”. Extended version of [c1]. 2021. [arXiv:2106.05064](https://arxiv.org/abs/2106.05064)

Submitted to *Mathematical Structures in Computer Science*. Referee recommendation: accept, pending minor revisions.

[p4] Tom de Jong and Martín Hötzel Escardó. “Domain Theory in Constructive and Predicative Univalent Foundations”. 2020. [arXiv:2008.01422](https://arxiv.org/abs/2008.01422)

Extended version of [c3]. A revised version is planned as a separate journal article.

Invited talks

“Acyclic types and epimorphisms in HoTT”. *Homotopy Type Theory Electronic Seminar Talks (HoTTEST)*. Online. 17 November 2022.

“Acyclic types and epimorphisms in homotopy type theory”. *Theoretical Computer Science Seminar*. University of Birmingham, UK. 21 October 2022.

“Domain theory in constructive and predicative HoTT/UF”. *Seminar for foundations of mathematics and theoretical computer science*. University of Ljubljana, Slovenia. 31 May 2022.

“Domain theory in constructive and predicative HoTT/UF”. *Yorkshire and Midlands Category Theory Seminar (YamCATS 27)*. Leeds, UK. 12 May 2022.

“Predicative Aspects of Order Theory in Univalent Foundations”. *Categories and Types Seminar (CATS)*. Institute for Logic, Language and Computation (ILLC), University of Amsterdam (online). 16 March 2021.

Contributed talks

“Epimorphisms and acyclic types”. *Dutch Categories And Types Seminar*. Utrecht, the Netherlands. 20 March 2023.

“Order Theory and Propositional Resizing in HoTT/UF”. *Homotopy Type Theory Electronic Seminar Talks (HoTTEST) Event for Junior Researchers 2022*. Online. 13 January 2022.

“Sharp Elements and the Scott Topology of Domains”. *37th Conference on Mathematical Foundations of Programming Semantics (MFPS 2021)*. Salzburg, Austria (online). 2 September 2022.

“Predicative Aspects of Order Theory in Univalent Foundations”. *6th International Conference on Formal Structures for Computation and Deduction (FSCD 2021)*. Buenos Aires, Argentina (online). 22 July 2021.

“Domain Theory in Constructive and Predicative Univalent Foundations”. *29th EACSL Annual Conference on Computer Science Logic (CSL 2021)*. Ljubljana, Slovenia (online). 27 January 2021.

“Domain theory in predicative Univalent Foundations”. *6th Workshop on Homotopy Type Theory and Univalent Foundations (HoTT/UF 2020)*. Online. 7 June 2020.

“Constructive domain theory in Univalent Foundations”. *36th British Colloquium for Theoretical Computer Science (BCTCS 2020)*. Swansea, United Kingdom (online). 8 April 2020.

“The Scott model of PCF in Univalent Type Theory”. *8th Workshop on Computability, Continuity, Constructivity — from Logic to Algorithms (CCC 2019)*. Ljubljana, Slovenia. 5 September 2019.

“The Scott Model of PCF in Univalent Type Theory”. *25th International Conference on Types for Proofs and Programs (TYPES 2019)*. Oslo, Norway. 11 June 2019.

Research visits & invitations

Invited participant in the upcoming conference *Type Theory, Constructive Mathematics and Geometric Logic, CIRM*, France. May 2023

Upcoming research visit to the *Faculty of Mathematics and Physics, University of Ljubljana*, Slovenia. Joint visit with Dr. Ulrik Buchholtz, hosted by Dr. Egbert Rijke. April 2023.

Research visit to the *Faculty of Mathematics and Physics, University of Ljubljana*, Slovenia. Hosted by Prof. Andrej Bauer; working with Dr. Egbert Rijke. May–June 2022.

Teaching & supervision

Lecturer for the introductory course on *Domain theory and denotational semantics* at the upcoming *Midlands Graduate School (MGS) in the Foundations of Computing Science, University of Birmingham*, UK. 2–6 April 2023.

MGS is a collaboration between the universities of Birmingham, Leicester, Nottingham and Sheffield. It has been running for over twenty years, attracts industry sponsors, and is typically attended by a hundred participants from all over the world. This includes mostly PhD students in theoretical computer science, but also postdocs and participants from industry. <https://www.cs.bham.ac.uk/~mhe/events/MGS23>

Assistant supervisor to the PhD student Stiéphen Pradal, *University of Nottingham*. October 2022–present.

I guide Stiéphen in our scientific field as well as in the practical matters of PhD research, through discussions, feedback and questions, and by giving pointers to relevant literature.

Teaching Assistant, *HoTTEST Summer School 2022*, Online. July–August 2022.

The school ran both synchronously and asynchronously for two months and featured parallel introductions to homotopy type theory and formalisation, ending with a series of colloquia introducing more advanced topics and exciting areas for further study. It attracted the interest of over 2000 people that registered.

As a teaching assistant, I was responsible for running tutorial sessions, designing exercises, and responding to questions and requests in the online discussion groups. Our aim was to build community among all of the participants, irrespective of geography.

Teaching Assistant, *University of Birmingham*, UK. 2018–2022.

2021–2022	<i>Advanced Functional Programming</i>	3rd year module
	<i>Functional Programming</i>	2nd year module
2020–2021	<i>Theories of Computation</i>	1st year module
	<i>Functional Programming</i>	2nd year module
2019–2020	<i>Functional Programming</i>	2nd year module
	<i>Network Security</i>	3rd year module

	Co-supervised a project on <i>Domain Theory in Agda</i> , which was awarded the <i>Distinguished Dissertation Prize</i>	final year project
2018–2019	<i>Models of Computation</i>	2nd year module
	<i>Mathematical Foundations of Computer Science</i>	1st year module

As a teaching assistant, I was responsible for running tutorials, marking assignments and exams, answering questions by students both in-person and online. In the (*Advanced*) *Functional Programming* modules I played a major role in the design of assignments, class tests and exams. Moreover, I was leading the teaching assistants in the complex task of designing automated marking scripts that generated useful feedback for students.

Teaching Assistant for *Topos Theory* at the *Midlands Graduate School (MGS)*, *University of Nottingham*, UK. 10–14 April 2022.

This advanced course was taught by Dr. Eric Finster and I was responsible for producing solutions to the exercises.

Teaching Assistant for *Univalent Type Theory in Agda* at the *Midlands Graduate School (MGS)*, *University of Birmingham*, UK. 14–18 April 2019.

This introductory course was taught by Prof. Martín Escardó and I was responsible for assisting students in the exercise classes.

Mentor, *School and Workshop on Univalent Mathematics 2019*, *University of Birmingham*, UK. 1–5 April 2019.

I was responsible for assisting students with both the theory and practice of type theory, in particular the formalisation of mathematics in the proof assistant *Coq*.

Teaching Assistant, *Utrecht University*, The Netherlands. 2017–2018.

Period 2/4 (2017–2018)	<i>Group Theory</i>	1st year BSc course
Period 1/4 (2017–2018)	<i>Foundations of Mathematics</i>	3rd year BSc course

My duties included running exercises classes, marking homework and explaining the solutions to the homework problems.

Assistant maths teacher, *Stichting Studiebegeleiding Leiden*, The Netherlands. 2014–2018.

Organised three-day training courses aimed at secondary school students preparing for their maths finals. Duties included correcting exercises and providing students with feedback and help in exercise classes.

Professional service

Reviewer for *Information Processing Letters (IPL)* and *Mathematical Structures in Computer Science*.

IPL features concise research contributions on fundamental aspects of information processing and theoretical computer science.

Programme committee member for the upcoming *Workshop on Homotopy Type Theory/Univalent Foundations*, April 22–23 2023 in Vienna, Austria.

Co-founder and co-organiser of a monthly, peripatetic, specialist seminar on univalent mathematics and type theory, *University of Nottingham* and *University of Birmingham*, UK. December 2022–present.

Dr. Eric Finster and I founded this seminar series as a way to drive research in homotopy type theory and foster collaboration between the Universities of Birmingham and Nottingham. <https://tdejong.com/ASSUME>

Co-organiser of the weekly *Theoretical Computer Science* seminar, *University of Birmingham*, UK. 2022.

I invited external speakers from all over the UK to give talks in the seminar.

Co-organiser of a weekly seminar for PhD students and postdocs in *Theoretical Computer Science*, *University of Birmingham*, UK. 2018–2022.

This seminar provided excellent opportunities for PhD students to practice their conference talks and moreover helped to build a sense of community.

Local co-organiser of the *School and Workshop on Univalent Mathematics 2019*, *University of Birmingham*, UK. 1–5 April 2019.

Responsibilities included sorting out catering, teaching venues, IT support, reimbursements, etc.