

# TOMÁŠ JAKL – CURRICULUM VITAE

## CONTACT

Address: Matematický Ústav AV ČR  
Žitná 25  
115 67 Praha 1  
Czech Republic

E-mail: [jakl@math.cas.cz](mailto:jakl@math.cas.cz)

Website: <https://tomas.jakl.one>

ORCID: 0000-0003-1930-4904

## EMPLOYMENT

- **April 2023 – present, Research Fellow**  
Institute of Mathematics of the Czech Academy of Sciences
- **April 2023 – present, Assistant Professor**  
Faculty of Information Technology at the Czech Technical University
- **February 2020 – March 2023, Research Associate (postdoc)**  
University of Cambridge, EPSRC project *Resources and co-Resources: a junction between categorical semantics, model theory and descriptive complexity*  
Principal Investigator: Prof. Anuj Dawar
- **April 2018 – February 2020, Chercheur, contrat durée dét. (postdoc)**  
CNRS and Université Côte d'Azur, ERC project *DuaLL*  
Principal Investigator: Prof. Mai Gehrke
- **January 2018 – March 2018, Teaching Associate (lecturer)**  
University of Birmingham, School of Computer Science

## EDUCATION

- **2013 – February 2018, joint PhD degree**, Charles University & University of Birmingham  
Thesis title: *d-Frames as algebraic duals of bitopological spaces*  
Supervisors: Prof. Achim Jung, Prof. Aleš Pultr
- **2013 – 2016, RNDr degree**, Charles University
- **2011 – 2013, Master's degree (summa cum laudae)**, Charles University in Prague  
Programme of Study: Discrete models and algorithms.  
Master thesis: *Some point-free aspects of connectedness*  
Supervisor: Prof. Aleš Pultr

- **2008 – 2011, Bachelor’s degree**, Charles University in Prague  
 Programme of Study: General Computer Science.  
 Bachelor thesis: *Arimaa challenge–comparison, study of MCTS versus alpha–beta methods*  
 Supervisor: Dr. Vladan Majerech

## PUBLICATIONS

*In my research field, authors are usually listed in the alphabetical order.*

### IN REFEREED CONFERENCE PROCEEDINGS

- **Tomáš Jakl**, Dan Marsden, Nihil Shah. *A categorical account of composition methods in logic*. Accepted at LiCS 2023.
- Samson Abramsky, **Tomáš Jakl**, Thomas Paine. *Discrete Density Comonads and Graph Parameters*. Coalgebraic Methods in Computer Science (CMCS 2022). Lecture Notes in Computer Science, vol 13225. Springer, 2022.
- Anuj Dawar, **Tomáš Jakl**, Luca Reggιο. *Lovász-type Theorems and Game Comonads*. Proceedings of the 36th Annual ACM/IEEE Symposium on Logic in Computer Science, LICS 2021.
- Mai Gehrke, **Tomáš Jakl**, Luca Reggιο. *A Duality Theoretic View on Limits of Finite Structures*. Foundations of Software Science and Computation Structures - 23rd International Conference, FoSSaCS 2020.
- **Tomáš Jakl**, Achim Jung. *Free Constructions and Coproducts of  $d$ -Frames*. 7th Conference on Algebra and Coalgebra in Computer Science (CALCO), LIPIcs, 2017.
- **Tomáš Jakl**, Achim Jung, Aleš Pultr. *Bitopology and four-valued logic*. Proceedings of the 32nd Annual Conference on Mathematical Foundations of Programming Semantics (MFPS), ENTCS, 2016.

### IN REFEREED JOURNALS

- Mai Gehrke, **Tomáš Jakl**, Luca Reggιο. *A Cook’s tour of duality in logic: from quantifiers, through Vietoris, to measures..* To appear in April 2023 in the Outstanding Contribution to Logic (Springer), Volume 25, 2023. arXiv:2007.15415.
- Mai Gehrke, **Tomáš Jakl**, Luca Reggιο. *A duality theoretic view on limits of finite structures (Extended version)*. Logical Methods in Computer Science (FoSSaCS 2020 Special Issue). Volume 18, Issue 1, 2022.
- **Tomáš Jakl**. *Canonical extensions of locally compact frames*. Topology and its Applications, Volume 273, 2020.
- **Tomáš Jakl**, Achim Jung, Aleš Pultr. *Quotients of  $d$ -frames*. Applied Categorical Structures, Volume 27, 2019.
- Richard N. Balla, Bernhard Banaschewski, **Tomáš Jakl**, Aleš Pultr, Joanne Walters-Waylande. *Tightness relative to some (co)reflections in topology*. Quaestiones Mathematicae, Volume 3, 2015.

## IN PREPARATION

- **Tomáš Jakl**, Dan Marsden, Nihil Shah. *A game comonadic account of Courcelle and Feferman–Vaught–Mostowski theorems*. Submitted. arXiv:2205.05387.
- **Tomáš Jakl**, Anna-Laura Suarez. *Polarities, closure systems, and the frame of strongly exact filters*.
- **Tomáš Jakl**, Luca Reggio. *An Invitation to Game Comonads*. (Lecture notes for the ESSLLI 2022 course *Relating Structure to Power: An Invitation to Game Comonads*, details: <https://tomas.jakl.one/teaching/2022-su-game-comonads>)

## THESES & TECHNICAL REPORTS

- **Tomáš Jakl**, Dan Marsden, Nihil Shah. *Generalizations of Bilinear Maps – Technical Report*. arXiv:2205.05382, 2022.
- Wesley Fussner, Najwa Ghannoum, **Tomáš Jakl**, Carlos Simpson. *Classification of Finite Semigroups and Categories Using Computational Methods*. In: C. Hales et al. (eds.), *Proceedings of the 5th Conference on Artificial Intelligence and Theorem Proving (AITP 2020)*.
- **Tomáš Jakl**. *d-Frames as algebraic duals of bitopological spaces*. Charles University and University of Birmingham (Ph.D. thesis), 2017.
- **Tomáš Jakl**. *Algebraic and topological methods in computer science*. University of Birmingham (thesis proposal), 2015.
- **Tomáš Jakl**. *Some point-free aspects of connectedness*. Charles University (Master thesis), 2013.
- **Tomáš Jakl**. *Arimaa challenge – comparison study of MCTS versus alpha-beta methods*. Charles University (Bachelor thesis), 2011.

## COMMITTEE WORK

[P] = Programme Committee, [O] = Organising Committee

<i>Resources and Co-Resources closing workshop, July 2023</i>	[P,O]
<i>Structure meets Power Workshop 2023</i> (LiCS 2023 affiliated) <a href="https://www.cst.cam.ac.uk/conference/structure-meets-power-2023">https://www.cst.cam.ac.uk/conference/structure-meets-power-2023</a>	[P]
<i>Topology, Algebra, and Categories in Logic 2022 (TACL 2022)</i> <a href="http://www.mat.uc.pt/~tacl2021/">http://www.mat.uc.pt/~tacl2021/</a>	[P]
<i>Structure meets Power Workshop 2022</i> (ICALP 2022 affiliated) <a href="https://www.cst.cam.ac.uk/conference/structure-meets-power-2022">https://www.cst.cam.ac.uk/conference/structure-meets-power-2022</a>	[P,O]
<i>Structure meets Power Workshop 2021</i> (LICS 2021 affiliated) <a href="https://www.cst.cam.ac.uk/conference/structure-meets-power-2021">https://www.cst.cam.ac.uk/conference/structure-meets-power-2021</a>	[P,O]

*Topology, Algebra, and Categories in Logic 2019 (TACL 2019)* [O]

<https://math.unice.fr/tacl/2019/>

*TACL 2019 summer school* [O]

<https://math.unice.fr/tacl/2019/school/>

## TALKS

### INVITED

- Resources in Computation workshop, London, 21-23 September 2022
- Duality and More (workshop), Nice, 16-20 May 2022
- Yorkshire and Midlands Category Theory Seminar, online, 10 January 2022
- Online Workshop on Resources and Co-Resources, online, 26 March 2020
- International Workshop on Topological Methods in Logic VI (ToLo), Tbilisi, 2 July 2018
- Prague Seminar on Paraconsistent Logic II, Prague, 25 June 2017
- International Workshop on Topological Methods in Logic V (ToLo), Tbilisi, 15 June 2016

### CONTRIBUTED

- Applied Category Theory 2021 (ACT 2021), 6 July 2021
- 24th International Conference on Foundations of Software Science and Computation Structures (FoSSaCS 2021), 1 April 2021
- Logic Colloquium 2019, Prague, 12 August 2019
- Workshop on Algebra, Logic and Topology, Coimbra, 27 September 2018
- Topology, Algebra, and Categories in Logic (TACL), Prague, 30 June 2017
- Algebra and Coalgebra in Computer Science (CALCO), Ljubljana, 14 June 2017
- Asymmetric Topology section on 31th Summer Conference on Topology and its Applications, Leicester, 2 August 2016
- Mathematical Foundations of Programming Semantics XXXII (MFPS 2016), Pittsburgh, 24 May 2016

## TEACHING EXPERIENCE

### LECTURER ROLE

**In 2022:** *Relating Structure to Power: An Invitation to Game Comonads* (a course at the 33rd European Summer School in Logic, Language and Information, ESSLLI 2022)

- The only course of ESSLLI 2022 sponsored by the European Association for Computer Science Logic (EACSL).

**In 2018:** *Data Structures and Algorithms* (University of Birmingham, spring term)

- Approx. 180 students of mixed study background (either enrolled to the MSc course or in the Year in Computer Science).
- The work involved preparation of new course material, materials for exercise classes, management of two teaching assistants, and preparation of exam papers.

## TEACHING ASSISTANT ROLE

<b>2022–2023:</b>	Discrete Mathematics	(University of Cambridge, Michaelmas & Lent terms)
	Denotational Semantics	(University of Cambridge, Michaelmas term)
<b>2021–2022:</b>	Denotational Semantics	(University of Cambridge, Michaelmas term)
<b>2020–2021:</b>	Complexity Theory	(University of Cambridge, Easter term)
	Denotational Semantics	(University of Cambridge, Michaelmas term)
<b>2017–2018:</b>	Functional Programming	(University of Birmingham, autumn term)
<b>2016–2017:</b>	Models of Computation	(University of Birmingham, spring term)
<b>2015–2016:</b>	Models of Computation	(University of Birmingham, spring term)
	Functional Programming	(University of Birmingham, autumn term)
<b>2014–2015:</b>	Functional Programming	(University of Birmingham, autumn term)
<b>2013–2014:</b>	Linear Algebra I	(Charles University, winter term)

## STUDENT SUPERVISION

- Najwa Ghannoum, partial PhD co-supervision, 2019
- Mark Karpilovskij, 2nd year undergraduate software project, 2015

## REFEREEING WORK

### PAPER REVIEWS

European Journal of Combinatorics (2021, 2022, 2023); Applied Categorical Structures (2×2022); Quaestiones Mathematicae (2022); Houston Journal of Mathematics (2019, 2021, 2022); Journal of Logical and Algebraic Methods in Programming (2021); Logical Methods in Computer Science (2018, 2020); Topology and its Applications (2019, 2020, 2021); Logic in Computer Science (2019, 2019); Rocky Mountain Journal of Mathematics (2019); Mathematical Structures in Computer Science (2019); Transactions on Computational Logic (2020); Outstanding Contributions to Logic (2020); Studia Logica (2019); Relational and Algebraic Methods in Computer Science (2019).

### GRANT REFEREEING

The Czech Science Foundation, GAČR (2021).

## FUNDING

<b>2025–2026</b>	<b>Programme Johannes Amos Comenius (OP JAK)</b> , MSCA Fellowships CZ
<b>2023</b>	<b>Seal of Excellence</b> in Marie Skłodowska-Curie Actions, European Postdoctoral Fellowship
<b>2017</b>	<b>Fellowship</b> by the Mobility Fund (Charles University)
<b>2016</b>	<b>Attendance support</b> by the 32nd Annual Conference on Mathematical Foundations of Programming Semantics (MFPS 2016) <b>Fellowship</b> by the Mobility Fund (Charles University)

## OTHER

- Maintaining the TACL series website: <https://math.unice.fr/tacl/>.
- Maintaining and regularly contributing to the Game Comonad Wiki: <https://kam.mff.cuni.cz/~jaklt/comonadwiki/>.
- Notable public software projects:
  - Rabbocop ([github.com/jaklt/rabbocop](https://github.com/jaklt/rabbocop)): comparison of parallelisations of AlphaBeta, Monte Carlo Tree and MTD(f) algorithms for AI game strategies, written in Haskell.
  - prAk ([github.com/progma](https://github.com/progma)): an online interactive platform for learning programming, written in JavaScript; my role: ported QuickCheck, implemented custom sandboxing and testing, QuadTrees, shape recognition based on rational trigonometry, and more.
  - pseudolisp ([github.com/jaklt/pseudolisp](https://github.com/jaklt/pseudolisp)): implementation of a custom lisp variant with lazy evaluation, written in C.
- Engaged, two children.