

# Basil L. Contovounesios

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I am a computer programmer with a special affinity for the design and implementation of programming languages, compilers, and formal verification. In the past I have worked primarily on compilers, developer tools, and libraries in industry, and on static and dynamic analysis of dynamic programming languages during a doctoral fellowship at EPFL. My broader interests include systems engineering and computer architecture. I am an avid contributor to Free and Open Source Software projects, particularly as a developer of GNU Emacs and maintainer of its packages.

## Experience

- 2023–24    PhD Student · EPFL, the Swiss Federal Institute of Technology in Lausanne, *Switzerland*  
*Systems and Formalisms Lab, supervised by Clément Pit-Claudel · 2-month project assistantship*  
*Computer and Communication Sciences Doctoral Program · 1-year fellowship*
- Created a **static analyser** for tracking dependencies on dynamic variables in Emacs Lisp; developed a **Clang/LLVM plugin** for instrumenting global variables in GNU Emacs; supervised Tsung-Han Liu's master's semester project, resulting in an extended abstract at the *International Workshop on the Theory and Practice of Static Analysis (TPSA 2026)*: [popl26.sigplan.org/details/tpsa-2026-papers/3](http://popl26.sigplan.org/details/tpsa-2026-papers/3)
  - Teaching Assistant for **first iteration** of *CS-173 Fundamentals of Digital Systems*: created tutorials and reference materials on **RISC-V and Verilog**; designed and graded exercises and exam questions for around **400 students**; assisted students in person and via online Q&A forum
- 2022–23    Software Engineer · TACC Compiler Team · Arista Networks, *Ireland*
- Developed Python tools for **tracking memory usage** across network switch processes; improved C++ **code generated** for nested run-time data structures of the TAC language; extended OpenGrok TAC support; created an Emacs TAC package leveraging its **Tree-sitter** grammar
- 2021–22    Computer/Networks Technician · Hellenic Navy, *Greece*  
*Mandatory military service · 1-year conscription*
- Provided IT support and **programming instruction** (Python, C) within my unit; reported on final plenary session of ARESIBO, an EU Horizon 2020 research project on border surveillance
- 2019–20    Software Engineer · TACC Compiler Team · Arista Networks, *Ireland*  
*8-month industrial placement*
- Extended **type checking** in TACC compiler (C++); added support for generating packed C++ enumerations by default, **reducing the size** of small ones by 50–75% at the expense of ABI stability; identified and fixed performance and **file race condition** issues in a debugging tracer utility (GNU C library)
- 2015–16    Front End Developer, UI/UX Engineer · FieldAware, *Ireland*  
*3-month summer internship, 7-month industrial placement*
- Assisted in design and implementation of new web application features (JavaScript, Python) including **internationalisation** and a library for **composable prototypal inheritance**; maintained AMD modules and libraries using Dojo Toolkit
- 2014    Undergraduate Research Assistant · Trinity College Dublin, *Ireland*  
*Distributed Systems Group, supervised by Stefan Weber · 3-month summer internship*
- Deployed a modest **Debian Beowulf cluster** for ns-3 network simulations; **reviewed literature** on Information-Centric Networks

## Education

- 2020–21 Trinity College Dublin, *Ireland* · Master in Computer Science  
Dissertation: *An equivalence checker for  $\pi$ -calculus models* (in Go), supervised by Vasileios Koutavas
- 2012–20 Trinity College Dublin, *Ireland* · BA Moderatorship in Computer Science  
**First Class Honours (I)** grade; **Book Prize** for achieving First Class in annual results (2013–15)  
**Victor W. Graham Prize** for highest grade (1<sup>st</sup> place) in Pure Mathematics (2013)

## Selected independent projects

- 2021– Olmacs (author) · [sr.ht/~blc/matrics](http://sr.ht/~blc/matrics)  
*Emacs bindings in C for the Olm cryptographic ratchet library*
- Developing fluency with the GNU Autotools stack (M4, Autoconf, Automake, Libtool, Gnulib), GCC hardening flags, ASan, UBSan, and Valgrind, under which the dynamic module compiles and runs cleanly; contributing release management **patches to Gnulib** in the process
- 2017– GNU Emacs (developer) · [gnu.org/s/emacs](http://gnu.org/s/emacs)  
*Text editor written in C, programmable in Emacs Lisp*
- Rewrote WebP animation support (C), fixing **memory leaks**; rewrote JSON encoding (Lisp), reducing garbage collections by an **order of magnitude** and wall time by up to 70%; rewrote UPower battery status reporting; extended a regular expression parser and **linter**, and fixed detected bugs; and hundreds of other bugfixes, docfixes, and features
  - Participating in mailing list discussions and workflow, reviewing patches; currently working on adding built-in support for AVIF images and PDF documents (Poppler, MuPDF, PDFium)
- 2017– Ivy (maintainer) · [github.com/abo-abo/swiper](https://github.com/abo-abo/swiper)  
*Incremental text completion interface and search library for Emacs · **top 11%** by GNU ELPA downloads*
- Heavily improved Emacs **integration** and compatibility; currently rewriting file search via subprocesses for better **cross-platform** behaviour and a more responsive and consistent UI
- 2017– Dash (maintainer) · [github.com/magnars/dash.el](https://github.com/magnars/dash.el)  
*Extensive list, macro, destructuring, and combinator library for Emacs · **top 5%** by GNU ELPA downloads*
- Heavily refactored core routines and build system for correctness, speed, macro hygiene, and compatibility; implemented efficient **lexicographic permutations** of multi/sets per Knuth

## Volunteering

- 2023–24 Head of Communication · PolyDoc (EPFL, PhD Students' Association), *Switzerland*  
Compiled a **monthly newsletter** and other announcements for **over 2,000** PhD students
- 2019–20 Secretary · Trinity Global Development Society, *Ireland*  
Managed memberships and committee meetings; compiled **annual report**
- 2015–17 Treasurer · Dublin University Internet Society (TCD Netsoc), *Ireland*  
Handled **finances**; organised speakers, events, and international **trips** to FOSDEM
- 2014–20 Junior System Administrator · Dublin University Internet Society (TCD Netsoc), *Ireland*  
Gave introductory **talks** on GNU/Linux, regular expressions, and Emacs; set up password store synchronisation across servers; administered services and accounts for around **200 users**

## Skills

- Languages **English** (fluent), **Greek** (fluent), **German** (conversational), **French** (conversational)
- Programming Emacs Lisp, Python, C, C++, Go, JavaScript, Java, Scala, Clojure, Haskell, Dafny, Perl; RISC-V, ARM, x86; POSIX shell, Bash; GraphQL, SQL, AWK, M4; HTML, CSS
- Tools Git, Make, Autotools, Coreutils, Diffutils, GDB, Clang/LLVM, Docker,  $\LaTeX$ , Texinfo
- OS GNU/Linux (**LPIC-1**)