Curriculum Vitæ

PERSONAL INFORMATION	**Árpád Goretity** Software Architect, Data Scientist h2co3@h2co3.org https://github.com/H2CO3 https://linkedin.com/in/h2co3
AREAS OF INTEREST	• Programming Language Design and Implementation • Functional Programming, Type Theory, Domain-Driven Design • Statistical and Stochastic Methods, Machine Learning • Bioinformatics, Biological Data Analysis • Information Security, Cryptography, Privacy Issues • Free/Libre and Open-source Software, Activism
EDUCATION 2013–2016	**Pázmány Péter Catholic University** Faculty of Information Technology and Bionics **B.Sc. in Molecular Bionic Engineering** Thesis: *Design and FPGA Implementation of a Protein Structure Comparison Method Based on Alignment of Backbone Conformations* Qualification: *Excellent*
2018–2020	**Università degli Studi di Padova** Dipartimento di Matematica "Tullio Levi-Civita" **M.Sc. in Data Science** Thesis: *Towards Personalized Disease Risk Prediction from Metagenome Analysis of the Microbiome* Qualification: *110 / 110 Cum Laude*
2020–	**Pázmány Péter Catholic University** Faculty of Information Technology and Bionics **Ph.D. in Computer Science** Research Topic: Design and Development of a Strongly-Typed Database and Domain Modeling Language Status: *In Progress*

Publications	• Árpád, Goretity; Zoltán, Nagy; Zoltán, Gáspári; "Acceleration of a Protein Structure Comparison Algorithm on FPGA," in *2017 European Conference on Circuit Theory and Design (ECCTD),* 2017 [online]. DOI: 10.1109/ECCTD.2017.8093342. Available: https://ieeexplore.ieee.org/document/8093342

Technical Skills	• Programming in several languages:
	
	   ◦ C, C++ and Objective-C (11 years of experience)
	   ◦ Rust (5 years)
	   ◦ Python (5 years)
	   ◦ Also had exposure to: Haskell, Swift, JavaScript, Lua
	
	• Technical typesetting in LaTeX

Presentations, Talks	• **The Sparkling Programming Language** *Prezi Tech Talks Budapest, 12 March 2014* In this talk, I presented the design decisions and implementation details behing Sparkling, my lightweight, dynamic, modern scripting language. I compared it to existing extension languages, and demonstrated how Sparkling improves performance, ergonomy, and correctness in specific situations. https://youtube.com/watch?v=sZPjcF8naGg • **Compiler Design and Implementation** *Swift Meetup Budapest, September 2015–June 2016* In this 6-part series, I discussed the basics of implementing a compiler for modern, statically-typed, native programming languages. The topics of lexing, parsing, semantic analysis, optimization, code generation, and interaction with a language runtime have been covered through short (30-40 min) presentations and longer (1-2 hours) practical coding sessions. By following along, participants have developed a compiler for a small and simplified, Swift-like language. GitHub: Swift Meetup Budapest • **Non-Pessimizations in the Swift Compiler** *Swift London, 15 November 2016* In this talk, I explored a collection of simple canonicalizations in the Swift compiler. I explained how they are implemented, which criteria one's code needs to meet in order to be eligible for these optimizations, and how one can write optimizer-friendly code in high-level languages like Swift. https://www.youtube.com/watch?v=1ugxdQX3H-4

- **Acceleration of a Protein Structural Alignment Method with FPGA Technology**
  Budapest Science Meetup, 20 February 2017

  This talk is a somewhat condensed and simplified summary of the aforementioned bioinformatics paper I co-authored, suitable for presentation to a more general and wider, but still scientifically educated, audience. (Unlike the other three talks, this one was delivered in Hungarian.)

  https://www.youtube.com/watch?v=erntqEW1Xi8

Teaching Experience

- Undergraduate Teaching Assistant, Linear Algebra I-II — *2014/15/1–2*

- Undergraduate Teaching Assistant, Introduction to Programming — *2014/15/1*

- Undergraduate Teaching Assistant, Programming I — *2014/15/2*

- Undergraduate Teaching Assistant, Introduction to Programming — *2015/16/1*

- Graduate Student Instructor, Introduction to Programming — *2017/18/1*

- Graduate Student Instructor, Nonlinear Dynamical Systems in Biology — *2020/21/1*

Projects
Summer 2015

- **CryptTalk @ Arenim Technologies, AB.**
  A very high-reliability, end-to-end encrypted VoIP solution for businesses and persons for whom secure phone calls are mission-critical. I have contributed security hardening features and UI improvements to the iOS app.

2016–2017

- **iCsekk @ SciApps.io and Díjbeszedő Holding Zrt.**
  An application for paying utility bills in Hungary. As a contractor, I have completely rewritten the core communication layer of the iOS app, fixing several high-severity security vulnerabilities in the process.

2017–Current

- **Pay with Curl @ Ching Ventures Ltd.**
  Curl are a London startup specializing in an alternative electronic payment method which is secure, convenient, and doesn't require credit or debit cards. As one of the two core iOS developers, I am mainly responsible for the middleware and part of the core business logic implemented in the mobile application.

2013–2017

- **Sparkling**
  Sparkling is an embeddable, strictly but dynamically-typed extension language. It offers a modern, ergonomic alternative to Lua. Implemented as a library, the compiler and the interpreter are written in portable C89.

LANGUAGES SPOKEN	• Hungarian — *Native*
	• English — *C2 (Cambridge CPE level A)*
	• French — *C1*
	• Italian — *B1 (No certificate)*
OTHER SKILLS AND FREE-TIME INTERESTS	• Driving License, Category B
	• Piano Playing and Musical Composition (Ragtime and Jazz)