Christopher Lee Simpkins
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I. Education

Ph.D. 2017 Georgia Institute of Technology *Computer Science*
Specialization: Intelligent Systems/Machine Learning
Dissertation: Integrating Reinforcement Learning into a Programming Language
Advisor: Charles L. Isbell

M.S. 2004 Southern Polytechnic State University *Computer Science*

B.S. 1990 United States Air Force Academy *General Engineering Curriculum*

II. Employment History

Assistant Professor of Computer Science	Kennesaw State University	*2025-present*
Senior AI Architect	Semtech/Sierra Wireless	*2022-2024*
Senior Software Engineer	IBM (The Weather Company), Atlanta, GA	*2019-2022*
Independent Consultant	MIT Press	*2016 to present*
Lecturer	College of Computing Georgia Institute of Technology	*2014-2019*
Instructor	College of Computing Georgia Institute of Technology	*2013-2014*
Software Engineering Consultant	Travel Syndication Technology, Atlanta, GA	*2014-2015*
Research Scientist II	Georgia Tech Research Institute Georgia Institute of Technology	*2001-2013*
Adjunct Professor	Southern Polytechnic State University	*2011*
Software Engineer	Internet Security Systems, Atlanta, GA	*2000-2001*
Software Engineer, **IT/Network Manager**	U.S. Air Force Columbus AFB, MS	*1998-2000*
T-37 Instructor Pilot	U.S. Air Force, Columbus AFB, MS	*1997-2000*
KC-135 Pilot	U.S. Air Force, McConnell AFB, KS	*1995-1997*
Space Instructor, **Interactive Courseware Developer**	U.S. Air Force Vandenberg AFB, CO; Lowry AFB, CO	*1992-1995*
Student Pilot	U.S. Air Force, Columbus AFB, MS	*1990-1992*

III. Current Fields of Interest

A. Early Work

My early work focused on developing the building blocks to enable working programmers to build AI systems. In my doctoral research I invented an arbitration algorithm for modular **reinforcement learning** to support modular **intelligent agent** programming, integrated reinforcement learning into an experimental programming language, and ran a programmer study to validate the usefulness of doing so. This language, AFABL (A Friendly Adaptive Behavior Language), is a domain-specific language embedded in Scala and includes abstractions for direct expression of reinforcement learning problems. My programmer study suggested that integrating reinforcement learning into a programming language yields measurable software engineering benefits.

B. Current Interests

I am interested an all areas of artificial intelligence (AI) but specialize in machine learning. I am particularly interested in interactive AI, that is, the design of agents that interact with dynamic environments that may include other agents, some of which may be human. My work is still mostly in reinforcement learning (RL), and I am currently focused on multi-agent reinforcement learning (MARL). Recently I have become very interested in causal inference.

B.1. Technical Approaches

- Reinforcement Learning
- Causal Inference
- Multi-agent Systems
- Deep Learning
- Evolutionary Algorithms
- Quantum Computing

B.2. Application Areas

- **AI for American thriving**. Decision support for policy makers in a variety of domains, technology for defense applications, development of American AI talent.
- **AI for human thriving**. Intelligent systems for mental health, activity/motion recognition for fall risk prediction, intelligent decision support for clinicians, AI-driven innovations in health science.

IV. Honors and Awards

1. NSF CISE Research Expansion (RE) Aspiring PI Workshop at FIU, December 18-19, 2025. One of 35 applicants selected out of 70 applicants from 25 institutions based on strength of NSF One-Page proposal.
2. IBM Eminence and Excellence Award with significant cash bonus, March 2022
3. Numerous Thank-a-Teacher awards every semester since 2014
4. Invited speaker, CETL Faculty Development Workshop "Making A Difference In The Classroom: What Works?" based on the content of numerous Thank-a-Teacher notes submitted to CETL by my students in CS 1331, February 20, 2014
5. Finalist and first runner-up for GTRI IRAD of the Year, June 2011
6. GTRI bonus for excellent performance, Information and Communication Lab, for research on adaptive agent programming, 2010
7. First GTRI bonus awarded by the Signature Technology Lab, for modernizing software development practices and creating the cooperative student lab, 2004
8. Air Force Commendation Medal, 17 August 2000
9. Air Force Expeditionary Medal, 1 March 1996
10. Outstanding Flight Crew Award, 350 Air Refueling Squadron, while deployed to the 4404th Wing (Provisional) in Saudi Arabia for Operation Southern Watch, February 1996
11. Air Force Commendation Medal, 17 September 1995
12. National Defense Service Medal, USAF, 1991

V. Publications and Presentations

A. Journal Papers (Refereed)

[1] Chiara Franzoni, Christopher Simpkins, Li Baoli, and Ashwin Ram. Using content analysis to investigate the research paths chosen by scientists over time. *Scientometrics*, 83(1):321–335, April 2010.

B. Conference Papers (Refereed)

[1] Christopher Simpkins and Charles L. Isbell. Composable modular reinforcement learning. In *Proceedings of the 33rd National Conference on Artificial Intelligence (AAAI)*, Honolulu, HI, Febrary 2019. **16.2% (1150/7095)**

[2] Christopher Simpkins, Charles L. Isbell, and Nicholas Marquez. Deriving behavior from personality: A reinforcement learning approach. In *10th International Conference on Cognitive Modeling*, pages 229–234, Philadelphia, PA, 2010.

[3] Christopher Simpkins, Sooraj Bhat, and Charles Isbell. Towards adaptive programming: Integrating reinforcement learning into a programming language. In *OOPSLA '08: ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications, Onward! Track*, Nashville, TN USA, October 2008. **28% (33/117)**

C. Workshop Papers (Refereed with Proceedings)

[1] Christopher Simpkins. Integrating reinforcement learning into a programming language. In *Proceedings of the 2010 SIGART/AAAI Doctoral Consortium*, Atlanta, GA, July 2010. **35.7% (15/42)**

D. Workshop Papers (Refereed without Proceedings)

[1] Christopher Simpkins, Spencer Rugaber, and Charles L. Isbell. DSL design for reinforcement learning agents. In *SPLASH Workshop on Domain-Specific Language Design and Implementation*, October 2017.

VI. Teaching

A. Courses Taught

Kennesaw State University

Term	Course	Students
Fall 2025	CS 3642 Artificial Intelligence	38
Fall 2025	CS 8375 Advanced Artificial Intelligence	4
Spring 2025	CS 4277 Deep Learning	14
Spring 2025	CS 6070 Databases	20

Georgia Institute of Technology

Term	Course	Students
Summer 2019	CS 4641 Machine Learning	28
Summer 2019	CS 2340 Objects and Design	29
Spring 2019	CS 2803 Special Topics (Data Science/Engineering)	22
Spring 2019	CS 2340 Objects and Design	102
Spring 2019	CS 2316 Data Manipulation for Engineers	155
Fall 2018	CS 1331 Introduction to Object-Oriented Programming	668
Fall 2018	CS 2316 Data Manipulation for Engineers	230
Summer 2018	CS 2316 Data Manipulation for Engineers	39
Summer 2018	CS 4400 Introduction to Database Systems	61
Spring 2018	CS 2803 Data Manipulation for CS	26
Spring 2018	CS 2316 Data Manipulation for Engineers	141
Spring 2018	CS 1331 Introduction to Object-Oriented Programming	441
Fall 2017	CS 2316 Data Manipulation	215
Fall 2017	CS 1331 Introduction to Object-Oriented Programming	592
Summer 2017	CS 4400 Introduction to Database Systems	54
Summer 2017	CS 2316 Data Manipulation	26
Spring 2017	CS 2316 Data Manipulation	128
Spring 2017	CS 1331 Introduction to Object-Oriented Programming	314
Fall 2016	CS 4699 Undergraduate Research	2
Fall 2016	CS 4400 Introduction to Database Systems (1st half)	188
Fall 2016	CS 2340 Objects and Design (2nd half)	41
Fall 2016	CS 2316 Data Manipulation	229
Fall 2016	CS 1331 Introduction to Object-Oriented Programming	219
Summer 2016	CS 4400 Introduction to Database Systems	39
Summer 2016	CS 2316 Data Manipulation	30
Spring 2016	CS 4400 Introduction to Database Systems	120
Spring 2016	CS 1331 Introduction to Object-Oriented Programming	386
Fall 2015	CS 4911/4912 Design Capstone	48
Fall 2015	CS 1331 Introduction to Object-Oriented Programming	254
Spring 2015	CS 4911/4912 Design Capstone	41
Spring 2015	CS 1331 Introduction to Object-Oriented Programming	365
Fall 2014	CS 4911 Design Capstone	47
Fall 2014	CS 1331 Introduction to Object-Oriented Programming	436
Summer 2014	CS 2316 Data Manipulation for Engineers	48
Summer 2014	CS 2340 Objects and Design	46
Spring 2014	CS 4911 Design Capstone	41
Spring 2014	CS 1331 Introduction to Object-Oriented Programming	282
Fall 2013	CS 4911 Design Capstone	43
Fall 2013	CS 1331 Introduction to Object-Oriented Programming	352
Summer 2013	CS 2340 Objects and Design	61
Summer 2013	CS 1331 Introduction to Object-Oriented Programming	100
Spring 2013	CS 1331 Introduction to Object-Oriented Programming	180
Summer 2012	CS 4641 Machine Learning	18
Fall 2011	ASE 6121 Systems Engineering - Information Systems	7

Southern Polytechnic State University

Term	Course
Fall 2011	CS 3693 Application Programming (Scala)
Spring 2011	CS 3123 Programming Language Concepts

B. Curriculum Development

B.1. Georgia Institute of Technology

CS2340 Objects and Design Redesigned CS2340 with Scala, which builds directly on students' existing knowledge of Java and allows us to teach important new design paradigms used in modern software development. Taught Spring and Summer 2019.

CS2803 Data Science Engineering (working title) Working with senior faculty in CoC to create a new course for CS majors. First offered in Spring 2018, again in Spring 2019, this course covers the same material as CS2316 as well as additional material of interest to computer science majors such as AI systems engineering, big data and machine learning technologies (scikit-learn, TensorFlow, Hadoop, and Spark). Graduates will have some preparation for machine learning engineering roles, and students who take upper-division courses in these areas can focus on the concepts of those courses rather than implementation tools and technologies.

Python workshop for MS Quantitative and Computational Finance First offered August 2017, again in August 2018, this workshop provides incoming students in the MS Quantitative and Computational Finance program with the computational skills they will need to succeed in the computational courses they will take. This 30-35-hour workshop ensures that all students have a minimal base competence in computing. Topics include a Python review, text data processing (CSV, JSON, XML), file IO, web mining, and modern Python data analytics (iPython, Jupyter Notebooks, NumPy, Pandas, Matplotlib).

Introduction to Computing for SABIC Scholarship Students First offered in Spring 2017, again in Fall 2018, this course provides recent Saudi Arabian high school graduates who are part of the SABIC scholarship program at Georgia Tech with a gentle yet rigorous introduction to computing using Python.

Python Bootcamp for MS Analytics First offered by me in Fall 2016, this intensive five half-day course provides incoming students in the MS Analytics program with the basic Python skills they will need to succeed in the computational courses in their degree. Students have varied backgrounds, from computer science to business. This course ensures that all students have a minimal base of competence in Python so that they can be successful in their analytics courses.

CS2316 Data Manipulation Redesigned course with new material on data analytics in Python using standard tools such as iPython, Jupyter Notebooks, NumPy, Pandas, and MatPlotLib. In Fall 2017 I began working with Phan Anh "Tom" Nguyen and Professor Ellen Zegura to develop new Serve-Learn-Sustain (SLS) data sets and integrate them into CS 2316. In Spring 2018 I hired a TA, Rachel Golding, to create material for CS 2316 homework assignments using SLS MARTA data sets.

CS4641 Machine Learning Adapted the undergraduate machine learning course to the compressed summer schedule in 2012. Evaluated, chose, and implemented a new textbook that covers all of the material for the course. Revised again for the 2019 Berlin Summer Study Abroad Program, which I helped create and co-direct.

ASE6121 Systems Engineering - Information Systems Created a new course in information systems for the GTRI/CoE Professional Masters in Applied Systems Engineering. My ASE 6121 course provides engineers who are not computing specialists with basic proficiency in data modeling, database design and use, programming, data analysis and visualization, network information system architecture, security, and software engineering.

B.2. Southern Polytechnic State University

CS3693 Application Programming in Scala SPSU's CS 3693 course is meant to teach students practical skills in application programming to prepare them for senior capstone and eventual employment as professional software engineers. I created and taught a version of the course using the Scala programming language that integrated object-oriented programming, functional programming, actors-based concurrent programming, and software engineering practices such as distributed version control, testing, and automated build management.

VII. Project Leadership and Supervision

A. Performance of Funded Research

1. Title: **Adaptive Agents in Intelligent Tutoring Systems**
   Sponsor: US Army STTC
   P.I.: Charles Isbell
   Amount: $247K
   Contributions: Developed adaptive agent programming system and adaptive agents and prototype interactive narrative game to demonstrate adaptive agent and drama management research.

2. Title: **Scenario Adaptation for Accelerated Continuous Learning**
   Sponsor: US Army STTC
   P.I.: Mark Riedl and Charles Isbell
   Amount:
   Contributions: Developed adaptive agent programming system and adaptive agents for prototype intelligent narrative system to demonstrate research in scenario adaptation and adaptive non-player character authoring.

3. Title: **Advanced Agent Modeling**
   Sponsor: GTRI (IRAD)
   P.I.: Christopher Simpkins
   Amount: $53K
   Contributions: Performed entire project. Developed software libraries for reinforcement learning-based software agents and modeling techniques for representing human agents. Resulted in one published refereed conference paper, with one conference paper submission and two white paper funding proposals in preparation.

4. Title: **HCC-Small: Web Games to Advance Interactive Learning Agents**
   Sponsor: NSF
   P.I.: Andrea Thomaz
   Amount:
   Contributions: Developed algorithms for multiple-goal reinforcement learning. Resulted in published workshop paper.

5. Title: **CS Study Group: A Programmable Adaptive Environment**
   Sponsor: DARPA

P.I.: Charles Isbell
Amount:
Contributions: Developed conceptual framework for adding adaptivity to the ABL programming language. Resulted in published conference paper.

6. Title: **Patriot-Excalibur (PEX)**
   Sponsor: U.S. Air Force
   P.I.: Terry Hilderbrand
   Amount: Millions
   Contributions: I was hired into ITTL as a subject matter expert in Air Force flying operations and Extreme Programming expert on the PEX project, whose purpose is to create management software for Air Force flying squadrons. At the time, another contractor had the lead on PEX. While GTRI was clearly superior technically, the other contractor claimed that their use of a development methodology known as Extreme Programming and their employment of former Air Force pilots as subject matter experts made them the clear choice to lead the PEX project and take the lion's share of funding. My unique background as both an Air Force pilot and a senior software engineer with significant professional experience with Extreme Programming nullified the other contractor's arguments and helped GTRI win millions of dollars in additional funding and secure a leadership role in the PEX program.

7. Title: **Electronic Warfare Database (EA/EP)**
   Sponsor: Air Force
   P.I.: Lon Pringle
   Amount:
   Contributions: nearly single-handedly (98% of project work) designed and developed an electronic warfare data management system with novel data representations, algorithms, and user interfaces that led directly to a $2M follow-on project.

8. Title: **Specific Emitter Identification**
   Sponsor: Air Force
   P.I.: Paul Kemper
   Amount:
   Contributions: Investigated use of genetically and MIMIC designed neural networks for the identification of RF emitter signals using WEKA and hand-coded algorithms in Lisp and Java.

9. Title: **"Gremlin"**
   Sponsor: Classified
   P.I.: Robert Zimmer, Jr.
   Amount Funded for Entire Project: $4.65M
   Employee's Led/Supervised by Candidate:
   Contributions: In addition to designing the module architecture and build system on which "gremlin" is based, I authored requirements for the 2006 revision of "gremlin."

10. Title: **"Maverick"**
    Sponsor: Classified
    P.I.: William Borland
    Amount: Millions
    Contributions: **Chief Architect** and **lead software engineer** for team of 12 software engineers developing distributed applications and using Solaris, Linux, Oracle 9i, Java Swing, Tomcat 4, Servlets, JSP, and Struts framework. Spearheaded the migration of Maverick's search feature from a complex in-house developed design to a standard design based on popular open-source libraries, such as ANTLR (for query parsing).

11. Title: **SACRE BLEU: Software-Assisted Content Review Based on Language (English) Understanding**

Sponsor: ARDA (Now IARPA)
P.I.: Matt Kochan
Amount:
Contributions: The SACRE BLEU project sought to develop software that identified information of interest in arbitrary human-language text, where information of interest is determined by both policy and precedent. The system is intended for application to the problem of content review for classified information where release officers must aprove the sharing of vast quantities of information on often very short deadlines. My role was to investigate user-adaptive methods and help manage the project, in particular the overall architecture and evaluation of technology components.

12. Title: **MAT (MAT Analysis Tool)**
Sponsor: MSIC
P.I.: John Schultz
Amount:
Contributions: The MAT software package is a modular GUI platform for storing and analyzing materials experiments. I designed a data management system, a flexible user interface for displaying multiple experiments, and a modular plug-in architecture that enables the straightforward addition of new analysis modules, thereby leveraging the data storage and allowing analysts to easily compare experiment data in multiple ways in a single desktop application.

13. Title: **Antenna GUI**
Sponsor:
P.I.: Eric Kuster
Amount:
Contributions: Supervised the work of Lukasz Hall, summer intern from MIT, in the design and construction of a GUI for specifying and visualizing antenna designs for input to simulation evaluator.

14. Title: **Magnetics GUI**
Sponsor:
P.I.: Alexa Harter
Amount:
Contributions: Mentored and supervised the work of Stephen Schulze over several semesters in designing and implementing a GUI program for specifying and visualizing magnetic fields in numerical materials simulations.

15. Title: **IDMATS**
Sponsor: NORTHROP GRUMMAN INFORMATION TECHNOLOGY/RESTON, VA
P.I.: Michael Polovino and Christopher Simpkins
Amount: $104,000
Contributions: **Principal investigator** on project developing standardized XML formats and translators (hand-coded and XSLT) for materials signature measurement data.

B. Individual Student Guidance/Development

B.1. Undergraduate Students

1. Peter Lacey-Bordeaux (BS CS student, GT) worked with me on the creation of a game that uses AFABL-contolled non-player characters. Work resulted in a working computer game hosted at https://github.com/placeybordeaux/afabl-zombie.

2. Nicholas Marquez (BS CS, GT, 2010; MS CS GT, 2013; currently L5 Software Engineer at Google) chose me as his Cisco Scholar Graduate Student mentor for Summer 2009. Nicholas

continued to work with me during through 2009-2010. Work resulted in two research paper submissions, the second of which was published in the Proceedings of 10th International Conference on Cognitive Modeling.

3. Denis Bueno (BS CS, GT, 2007; MS, Cornell, 2008; PhD, Michigan, 2021; currently Principal Technical Staff Member at Sandia National Labs). Hired, mentored, and supervised Denis's work as a cooperative student from 2004 to 2007.
4. Matt Kurjanowicz (BS CS, GT, 2007; currently Principal Software Engineer Lead at Microsoft). Hired, mentored, and supervised Matt's work as a cooperative student from 2004 to 2007.
5. Stephen Schulze (BS CS, GT, 2006; currently at Kennesaw State University). Hired, mentored, and supervised Stephen's work as a cooperative student from 2004 to 2006.
6. Lukasz Hall (BS EECS, MIT, 2005; currently Staff Software Engineer at Walmart Global Tech) worked under my direct supervision during the summer of 2004 as a intern student.

VIII. Sponsored Program Development

A. Submitted as Lead or Co-Principal Investigator

1. **Materials Analysis Tool (MAT) Version 2**
   Solicitation: Invitation of James Feagan, MSIC
   Sponsor: MSIC
   Investigators: Christopher Simpkins
   Amount: $200K
   Submitted: August 2005 (funding has been promised but not yet identified)

B. Awarded as Lead or Co-Principal Investigator

1. **Context Dependent Qualitative Models for Statistical Value of Information**
   Solicitation: Knowledge Discovery & Dissemination (KDD)
   Sponsor: ITIC
   Investigators: Charles Isbell and Christopher Simpkins (Note: White paper based on ideas of David Roberts, who contributed significantly to the white paper.)
   Amount: $400K (2 years)
   Submitted: (White paper) November 2006 Note: white paper was accepted but the KDD program was canceled before contract was funded
2. **IDMATS**
   Solicitation: Sub Contract # ANSWER-SC-03-007 to Northrop Grumman Defense Mission Systems on contract GS09K99BHD0008
   Sponsor: NASIC
   Investigators: Michael Polovino and Christopher Simpkins
   Amount: $100K
   Period of Performance: 26 Jan 2004 to 26 July 2004
3. **Design Software for Large Scale Quantum Computation**
   Solicitation:
   Sponsor: ARDA, STIC, DTO, AFRL
   Investigators: John Cortese and Christopher Simpkins
   Amount: $633K
   Submitted: February 2005
   Note: Synopsis, Inc. offered to fund the project. GTRI/STL declined due to contracting issues.

C. Awarded as Key Team Member and Proposal Writer

1. **Anti-Tamper Validation and Verification Methodology Development**
   Solicitation: AFRL/SNTA SOW dated 20 May 2005
   Sponsor: AFRL
   Investigators: Bo Rotoloni
   Submitted: June 2006

2. **Comparative analysis of threat and decoy systems**
   Solicitation: Sparta, Inc. contract MDA908-99-D-0004 subcontract 99-571-259
   Sponsor: MSIC
   Investigators: John W. Schultz
   Period of Performance: 30 Mar 2004 to 23 Jun 2005

IX. Outreach and Service

A. Professional Activities

A.1. Conference Committee Activities

- **Program Chair**, Workshop on Non-Player Character AI (NPCAI) at AIIDE, 2011
- **Reviewer**, 2011 ACM South East Conference (ACMSE-2011)

A.2. Professional Memberships

- Member, Association for the Advancement of Artificial Intelligence (AAAI)
- Member, Association for Computing Machinery (ACM)
- Member, ACM Special Interest Group in Artificial Intelligence (SIGART)

B. University and College Service

B.1. Kennesaw State University

- **Core Member**, Kennesaw State University AI Governance Committee, 2025-present
- **Reviewer** CCSE C-Day, Fall 2025

C. Georgia Tech

- **Co-director**, College of Computing Berlin Summer Program, 2018 - 2019
- **Faculty advisor** for student Big Data Club, College of Computing, 2018 - 2019
- **Judge**, 13th Annual Undergraduate Research Spring Symposium, 17 April 2018
- Member, College of Computing International Programs task force, 2016 - 2019
- Scuba Diving Instructor, Georgia Tech Scuba, August 2014 - 2017

D. Civic Activities

- Knights of Columbus, 2025-present
- IBM P-TECH, Carver High School, Atlanta, GA, 2022
- Technical Mentor, **IBM Call for Code/Black Girls Code** 2021
- IBM Veterans mentor and coach, 2021-2022
- Assistant Coach, Sprayberry Junior Wrestling (USA WRESTLING Bronze Certified)
- Communications Director, The Georgia Ballet Guild, 2009-2010

X. Professional Development

- Completed GTRI Project Director certificate on 28 September, 2010
    1. Completed Org Dev Time Mastery course, 28 September, 2010
    2. Completed Org Dev Polishing Your Presentation Skills course, 2 September 2010
    3. Completed GTRI Intellectual Properties course, 27 July 2010
    4. Completed Org Dev Basics of Supervision course, 22 July 2010
    5. Completed GTRI Government Contracting course, 20 July 2010
    6. Completed GTRI Industrial Contracting course, 8 July 2010
    7. Completed GTRI Project Director course, 21 April 2010
    8. Completed GTRI Introduction to Primavera course, 14 April 2010
    9. Completed Supporting Projects in GTRI course, April 2010
- **GTRI Mentor/Mentee** program for young researchers identified as future leaders, 2003
- **USAF Instructor School, 1992**: Student lectures are videotaped for review and critique, then discarded. One of my lectures was kept as an example for future students to follow.
- **USAF Squadron Officer School, 1994**: Received written commendation for my presentation skills; cited for excellent performance in Leadership Reaction Course.

XI. Other

- PADI **Master Scuba Diver Trainer** and Emergency First Response Instructor # 347984 (PADI Pro Check: https://apps.padi.com/scuba-diving/pro-chek/)
- SSI Divemaster Instructor # 72876 (inactive as of January 2018)
- DAN DEMP (Diving Emergency Management Provider) and DFA Pro (Diving First Aid for Professional Divers) Instructor # 15550 (inactive as of November 2018)
- President and Organizer, Pro Scuba Training, LLC http://prost.us/
- **Fluent in German** (Goethe-Zertifikat C1 Number 01652-GZ-C1-18-86)
- **Fluent in French** (DELF B2 Number 033054-002105)