Vitalii Zhukov

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Education

Doctor of Philosophy (Ph.D.)   **University of Houston**   *2023*
- **Computer Science** [CGPA = 3.87] ◆ Dissertation topic: 'On the Mechanism of Competition and Outcomes in Schools of Thought and Other Realms of Human Endeavors'

Master of Science (M.S.)   **Peter the Great St. Petersburg Polytechnic University**   *2012*
- **Mechanical Engineering** ◆ Thesis topic 'Vibro Jaw Stone Crusher'

Professional experience

Research Assistant   **UH Affective & Data Computing Lab**   *2019 – Present*

Conducted data-driven research on modeling human performance in unfettered competitions. Investigated the nature of convergence in psychological sciences by analyzing bibliometric data for millions of publications. Was involved throughout the life cycle of the said projects, from dataset construction via advanced scripting all the way to statistical and AI modeling. **The list of projects follows:**

- **Project 1**: Convergence in Affective and Cognitive Sciences   2022 – 2023

  Many scientific breakthroughs since the middle of the 20th century are widely attributed to convergence science, that is, the confluence of conceptual knowledge from diverse disciplines. Nevertheless, little is known about the inner workings of convergence science. This project aimed to address the following research question: ***Does convergence science need to source comparable convergent scholarship to spread?*** I used affectivism and cognitivism – two competing schools of thought originating from psychological sciences – as proving grounds. Analyzing over half a million publications from PubMed, selected according to expertly chosen MeSH terms, I found that affectivism yields higher impact than cognitivism, as measured through normalized citations. Importantly, I found that this higher impact is strongly associated with higher level of topical diversity in the citations of affective publications. This is even though affective articles are characterized by lower levels of topical diversity when compared to cognitive articles. This study addresses a long-standing question about the relative strength of these two schools of psychological thought. At the same time, the study reveals that research characterized by low topical diversity, but broad value can generate highly diverse scholarly impact, as the case of affectivism indicates. Convergence science is not always a pre-requisite of research progress, but in some instances the result of transcendent mono-disciplinary advances.

- **Project 2**: Modeling of Human Performance in Unfettered Competitions   2019 – 2021

  This project aimed to address the following research question: ***Do freely competing humans, who are honing specific skills, attain performance that ascribes to a universal law?*** This question is of profound importance to understanding the nature and limitations of the constructive and destructive processes underlying human civilization. To this end, I studied three domains of human activity: 1) The performance of fighter pilots during WWII - a realm of competition in human-machine interaction with destructive aims. 2) The performance of computer science and biology researchers in obtaining NSF and NIH grants, respectively - a realm of intellectual competition with constructive aims. 3) The performance of Olympic US swimmers and French fencers - a realm of physical competition with constructive aims. Despite the differences among these three domains, I found all paired combinations of human performance curves to be log-normal and highly correlated. On deeper level, I found that given enough time, systems of freely competing skilled humans are dominated by the exceptional performance of a few individuals – a signature state of maximal system performance. In contradistinction, when individual performance is more equitably distributed, then either not enough time has been given to the system to evolve, or the competing actors are restrained or undercut in some sense – a signature state of suboptimal system performance.

Graduate Teaching Associate   **University of Houston**   *2021 – 2023*

- **Ubiquitous Computing - Fall '21, Fall '22, Fall '23**
  This senior class enrolls 60 students per semester and focuses on app development in iOS and watchOS using Swift and the Xcode development environment.
    - Designed and delivered the lab practicums, amounting to 1.5 hours of lecturing each week.
    - Designed and solved the class assignments, which had the form of iPhone and Apple Watch apps.
    - Developed a web-based system for soliciting and visualizing weekly feedback from the students.

- **Statistical Methods – Spring '21, Spring '22, Spring '23**
  This graduate class enrolls 60 students per semester and focuses on advanced statistical modeling of large multimodal datasets using R programming.
    - Designed and delivered the lab practicums, amounting to 1.5 hours of lecturing each week.
    - Designed and solved the class assignments, which were drawn from our research datasets.
    - Developed a web-based system for soliciting and visualizing weekly feedback from the students.

Teaching Associate   **University of Houston**   *2019 – 2021*

- **Programming Fundamentals I, II – Summer '23, Summer '22**
  This undergraduate class enrolls 80 students per semester and focuses on structured programming and Object-Oriented Programming (OOP) paradigm using C++ programming language.
    - Delivered the lab practicums, amounting to 1.5 hours of instructing twice a week.
    - Designed class assignments, maintained automation grading tools.
    - Provided group and individual consultation and training sessions for students.

- **Programming and Data Structures – Summer '21, Fall'20**
  This undergraduate class enrolls 150-200 (Fall) and 80 (Summer) students per semester and focuses on data structures and algorithms using C++ programming language.

- **Introduction to Programming – Summer '21, Fall'20, Fall'19**
  This undergraduate class enrolls 150-200 (Fall) and 80 (Summer) students per semester and focuses on fundamentals of software development using C++ programming language.

Project / Delivery Manager   **Luxoft, A DXC Technology Company**   *2018*

- Led the software development efforts within the Deutsche Bank Security and Authorization Department, driving innovation and excellence in Agile product development. 3 successful release cycles, 2 new products.
- Collaborated closely with customer managers to shape the product vision, develop strategic plans, and ensure the successful delivery of projects, aligning with customer requirements and objectives.
- Coordinated department's engagement scale, orchestrating a substantial increase from 18 full-time employees (FTE) to 53 FTE, optimizing resource allocation and productivity.
- Demonstrated strong interpersonal and leadership skills by effectively communicating with, coaching, and coordinating a diverse team of more than 50 international employees spanning four countries, fostering a collaborative and high-performing work environment.

Software Engineer / Team Lead   **GS Labs, General Satellite Group**   *2013 – 2017*

- Played a pivotal role in developing internal software and hardware solutions tailored to enhance the Digital Video Broadcasting infrastructure, contributing to increased operational efficiency and system reliability.
- Pioneered the establishment of the Automation Department, taking charge of continuous integration/continuous delivery (CI/CD) and monitoring tools, streamlining workflows, and fostering a culture of automation to improve productivity and performance.
- Stack: Python3, Celery, Tornado, Redis, Postgres, Bash, Debian GNU/Linux

Technical Support Engineer, Tier III   GS Labs, General Satellite Group   *2010 – 2013*

- Delivered top-tier support for encryption systems, subscription management systems, billing, and end-user receivers used by digital video broadcasting providers.
- Implemented an enterprise-level monitoring system consisting of three instances, overseeing over 5000 hosts, and monitoring 300 000 metrics.
- Streamlined operations by automating repetitive tasks using scripting languages such as Bash, PowerShell, and Python. Collaborated closely with the development team to formalize specifications for seamless integration with the monitoring system (Zabbix).

Languages, Technologies & Frameworks

- **Programming Languages**: Python3; R; C++; Swift; Bash; PowerShell; SQL.
- **Operating Systems**: Windows Server 2008, 2012; MacOS; Debian; Ubuntu.
- **Virtualization**: Heroku; Hyper V; ESXI; Proxmox.
- **Databases**: MSSQL; Oracle; MySQL (MariaDB); Postgres.
- **Other**: Atlassian Jira/Confluence; Redmine; Git; PyCharm; Xcode; RStudio; LaTeX; Zabbix; Grafana;
- **Program Management**: SDLC; Agile; Scrum; Waterfall; ITIL; PRINCE2; Business Process Management; Risk Management; ISO Standards (9001, 21500, 31000).

Journal Publications

1. Zhukova, M.A., Li, N., **Zhukov, V.** and Grigorenko, E.L., 2023. A Dimensional Approach to Discrepancy in Parenting Styles in Russian Families. *Children*, *10*(8), p.1367.

2. **Zhukov, V.**, Petersen, A.M., Dukes, D., Sander, D., Tsiamyrtzis, P., and Pavlidis, I., 2023. Convergence in Affective and Cognitive Sciences. *Nature Human Behavior*, under review.

3. **Zhukov, V.**, Tsiamyrtzis, P., and Pavlidis, I., 2023. A Universal Model of Human Performance in Unfettered Competitions. *Humanities and Social Sciences Communications*, under review.

Conference Publications

1. Hasan, MD. T., Tsiamyrtzis, P., **Zhukov, V.**, Manser, M., Wunderlich, R., and Pavlidis, I., 2023. Comprehensive Driver Survey – Linking Risk Profiles with Inclination/Disinclination Towards Automation. *ACM CHI 2024*, under review.

2. **Zhukov, V.**, Dukes, D., Sander, D., Tsiamyrtzis, P., and Pavlidis, I., 2023. Convergence in Affective Sciences. *International Society for Research on Emotion (ISRE) Conference 2022*.

Technical Blogging

- Personal technical blog site with focus on Large Language Models (LLM), Application Programming Interfaces (API), and Prompt Engineering: **vvzhukov.github.io**

Open Code - GitHub

1. **Zhukov, V.**, Tsiamyrtzis, P., and Pavlidis, I., Open code for: 'A Universal Model of Human Performance in Unfettered Competitions'. *Humanities and Social Sciences Communications*.
   https://github.com/vvzhukov/Modeling-of-Competitive-Human-Performance

2. **Z Zhukov, V.**, Petersen, Tsiamyrtzis, P., and Pavlidis, I., Open code for 'Convergence in Affective and Cognitive Sciences'. *Nature Human Behavior.*
   https://github.com/vvzhukov/Convergence-in-Affective-and-Cognitive-Sciences

Open Data - OSF

1. **Zhukov, V.**, Tsiamyrtzis, P., and Pavlidis, I., Open data for: 'A Universal Model of Human Performance in Unfettered Competitions'. *Humanities and Social Sciences Communications*.
   https://osf.io/9bjwx/

2. **Z Zhukov, V.**, Petersen, A.M., Dukes, D., Sander, D., Tsiamyrtzis, P., and Pavlidis, I., Open data for 'Convergence in Affective and Cognitive Sciences'. *Nature Human Behavior.*
   https://osf.io/v8qxs/

Awards

- GS Labs, General Satellite Group, Employee of the year   *2016*

Leadership Activities & Professional Services

- University of Houston (UH), NSM College, Member of Graduate Student Advisory Board   *2022*
- UH, Member of Grievance Committee   *2023*
- UH, Member of Academic Honesty Committee   *2021*
- UH, President of the Computer Science Graduate Students Association   *2019*

Professional Career Training

Database Development and Administration
Peter the Great St. Petersburg Polytechnic University   *2015*
Professional career training, 12-month program [CGPA = 4.0] ♦ Thesis topic: ''Zabbix monitoring for various databases"
- Classes: Microsoft SQL Server administration; Foundations of relational databases architecture; SQL foundations; Transact-SQL foundations; Microsoft windows server administration; Linux administration; PL/SQL foundations; Microsoft SQL server DB development; MySQL DB development; Oracle DB development and administration; Advanced Oracle DB development and administration.

Python Software Development
ITMO University   *2015*
Professional career training, 6-month program [CGPA = 4.0]
- Classes: Software design patterns; Software development foundations; Python v3

Certification

- Information Privacy and Security (IPS), #39951557   *2020*
- Responsible Conduct of Research for Engineers, #39951088   *2020*
- Conflict of Interest in Research Course, #39951556   *2020*
- Automating Administration with Windows PowerShell 3.0, #10961   *2017*
- ITIL Foundations v3, #0001529   *2016*
- Zabbix Certified Specialist, #CS1410-77   *2014*
- Database programming with PL/SQL, Oracle Academy   *2014*

References

- Ioannis Thomas Pavlidis
  Eckhard-Pfeiffer Distinguished Professor
  Department of Computer Science, University of Houston   ipavlidis@uh.edu

- Alexander M. Petersen
  Associate Professor
  Management of Complex Systems, University of California Merced   apetersen3@ucmerced.edu

- Tsiamyrtzis Panagiotis
  Associate Professor
  Department of Mechanical Engineering, Politecnico di Milano   panagiotis.tsiamyrtzis@polimi.it