Michael Shalyt

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Experience

2023 – Present **Associate Researcher & PhD at The Technion - Israel Institute of Technology**. Head of the Ramanujan Machine Group. Lead an interdisciplinary team pioneering *AI-for-science* initiatives.

- Direct a diverse group of 11 researchers, engineers, and mathematicians (undergraduate to postdoctoral).
- Set the group's strategic research roadmap, translating ideas into projects and results.
- Architect and evolve the group's flagship open-source Python library, prototyping AI-for-mathematics capabilities.
- Author and orchestrate competitive grant proposals and paper submissions to top-tier venues, resulting in publications at NeurIPS, ICML PNAS, and Scientific American.

2021 – 2025 **Game Economy & Systems Expert**. Freelance *hands-on* game designer with experience spanning from early conceptualization to live-ops and *data-driven* player behavior analysis.
Specialize in mathematical modeling, progression and balance simulations, market research, and reverse-engineering game design.
Consulted for:

- PlayGen: A startup using AI to dynamically optimize game progression, economy, and balance.
- Zarzilla: A studio developing social card games.
- Xternity: A startup creating tools for Web3 games.
- Chaos Sun: A 4X MMO featuring NFT-based characters and a crypto-economy.

2021 – 2024 **Game Systems Designer at Redemption Games**. Led *systems and economy* design for "Crushers!" as the *inaugural* team member.

- Guided the project from an early proof-of-concept to the studio's flagship game.
- Developed the first prototype in Python and engineered the core gameplay mechanics that fundamentally shaped the player experience.
- Crafted layered progression systems - incorporating both immediate progress and long-term meta-progression - to boost engagement and retention.
- Devised analytical models to assess player-cohort behavior, driving targeted design improvements.

2020 – 2023 **Head of Program & Algorithms Team Leader at Cycognito**. Operating as a *startup-within-a-startup*, *founded* the algorithms team and the "autonomous attack surface mapping" program. We used *data*

fusion and AI to discover and attribute digital assets for our customers automatically - gradually removing the need for humans in the loop.

- Grew to 9 group members, across 4 departments (algorithms, backend, app, analysts).
- Held multiple roles: managed day to day operations as the project manager, data and AI applications as algorithms TL, vision and alignment to Cycognito's strategy as the product/program manager.
- Went from 0 to multiple integrated products in production.

2018 – 2019 **Co-Founder & CEO at Evo.Do**. We created AI that automated the QA and validation process of complex or rapidly changing interactive software (games, rich apps, VR) - using *cutting edge Deep Reinforcement Learning* techniques.

- Went from 0 to MVP (based on patent-pending algorithms), pilot customers and seed investment.
- Evo.Do was part of Y Combinator (AI batch of W19) and the inaugural batch of Xcellerator (led by TAU Ventures).

2016 – 2018 **Co-Founder, CEO & VP Product at Aperio Systems**. We created algorithms to validate physical sensor data in heavy manufacturing facilities - against data malfunctions and malicious tampering - using *signal processing* and *machine learning*.

- Went from an idea to a deployed product, first customers, millions of dollars raised.
- Received multiple awards, including Gartner's 2017 "cool vendor" choice, CDM 2017 infosec award, won the ESB and Free Electrons pitch competitions and others.

2016 **Research Scholar** Prof. Dan Ariely's lab. Working with fintech startups to *apply Behavioral Economics* research to real-world challenges. San Francisco, USA.

2014 – 2015 **Malware Research Team Leader at Check Point**. Managing 8 researchers (2 abroad) working on PC and Android *malware analysis, reverse engineering* and *ML-for-cyber*.

2012 – 2014 **Research Team Leader at IDF (unit 8200)**. Managing 8 researchers working mostly on "secret needle in a hay stack", *data extraction* and *anomaly detection* projects.

2010 – 2012 **Researcher at IDF (unit 8200)**. Software patterns investigation and *reverse engineering*, *vulnerability detection*, product integration and support, expert consulting and research project management.

2005 **CT sensors R&D team at GE Healthcare**. Comparing X-ray *sensor response statistical models*, analytically and experimentally.

2004 – present Represented Israel at the 36th *International Physics Olympiad* (IPHO) - awarded a Bronze medal. Stayed on as part of a team of guides training the future Israeli physics teams. Was involved in the 12th Asian Physics Olympiad (2011) and 50th IPHO (2019).

Education

2009 – 2013 **MSc in Quantum Computing at the Technion**. Researched noise cancelation in open quantum systems using their statistical properties and optical controls. Co-supervised by Prof. J. Avron (Technion, Israel) and Prof. A. Retzker (Ulm, Germany). Results published. *GPA: 95.4*. Ranked **1st** in the track.

2005 – 2009 **Bachelor's degrees in Physics and Electrical Engineering at the Technion**. Majored in electro-optics and signal processing. Was part of the elite IDF program "Psagot" and a member of the *Technion Excellence program* for exceptional undergraduate students. Conducted research in the field of theoretical quantum optics. Results published. *GPA: 97 (Summa Cum Laude)*. Ranked **1st** in the dual-degree track.

2005 Graduated from the gifted children program at Leo-Beck High School, Haifa, excelling as the *top student in Physics*.

Awards and Honors

2026 Gold Reviewer, ICML 43 (South Korea).
2025 Awarded the Kenneth and Gloria Levy Scholarship for excellence in PhD studies.
2017 Best Pitch Award, Free Electrons (Singapore).
2017 Winner, ESB Pitch-off (Ireland).
2017 Gartner's "Cool Vendor" Choice (Aperio Systems).
2017 Winner, CyberTech Startup Competition (Israel).
2017 CDM Infosec Award (Aperio Systems).
2015 Best Speaker, Future of Security in Financial Services (Australia).
2007 Intel Excellence Award.
2007 Israel representative, inaugural Asian Science Camp (Taiwan).
2005 – 2009 Four Presidential Excellence Awards, Technion.
2005 – 2009 Technion Excellence Program.
2005 Bronze Medal, 36th International Physics Olympiad (Spain).

Publications

1. P. Ginzburg, **M. Shalyt**, A. Hayat, M. Orenstein. "Photon-Energy Qubit Generation by Spontaneous Emission in a V-type System", **J. Phys. B** 43 105502, 2010. Citations: 6. [*as part of BSc at the Technion*]
2. JE. Avron, O. Kenneth, A. Retzker, **M. Shalyt**, "Lindbladians for Controlled Stochastic Hamiltonians", **New J. Phys.** 17 043009, 2014. Citations: 13. [*as part of MSc thesis work at the Technion*]
3. R. Elimelech, O. David, C. De la Cruz Mengual, R. Kalisch, W. Berndt, **M. Shalyt**, M. Silberstein, Y. Hadad, I. Kaminer, "Algorithm-assisted Discovery of an Intrinsic Order Among Mathematical Constants", **Proceedings of the National Academy of Sciences**, 121, e2321440121, 2024. Citations: 8.
4. **M. Shalyt**, U. Seligmann, I. Beit-Halachmi, O. David, R. Elimelech, I. Kaminer, "Unsupervised Discovery of Formulas for Mathematical Constants", **NeurIPS** 37, 113156–113190, 2025. Citations: 2.
5. T. Raz, **M. Shalyt**, E. Leibtag, R. Kalisch, S. Weinbaum, Y. Hadad, I. Kaminer, "From Euler to AI: Unifying Formulas for Mathematical Constants", **NeurIPS** 38, 2026. Citations: 5.
6. **M. Shalyt**, R. Elimelech, I. Kaminer, "ASyMOB: Algebraic Symbolic Mathematical Operations Benchmark", **ICML** 43, 2026. Citations: 9.

Submitted papers

7. S. Weinbaum, E. Leibtag, R. Kalisch, **M. Shalyt**, I. Kaminer, "On Conservative Matrix Fields: Continuous Asymptotics and Arithmetic", arXiv:2507.08138, 2025. Citations: 2.

Patents

Michael Shalyt, Nataly Bendersky. "System and method for automated test generation and testing an application". 2019.

Conference Talks

1. "Spy in Your Pocket" at **Future of Security in Financial Services**, Sydney, Australia, January 2015. [*presenting internal research done at Check Point*]
2. "Man in the Binder" at **Kaspersky SAS**, Cancun, Mexico, February 2015. [*presenting a research whitepaper done at Check Point*]
3. "A Trillion Sensor World" at **Innovate Israel**, London, UK, September 2017. [*presenting an internal position paper created at Aperio Systems*]
4. "GPS Spoofing: No Longer a Fish Story" at **RSA**, San Francisco, USA, April 2018. [*presenting research into broad applications of our core algorithms at Aperio Systems*]
5. "Ramanujan Machine: Unsupervised Formula Conjecture Generation" at **AAAI**, Washington, USA, November 2024. **Invited talk**.
6. "Psychology in the Game Industry", guest lecture at **Princeton**, January 2025.
7. "ASyMOB: Algebraic Symbolic Mathematical Operations Benchmark" at **AI4X**, Singapore, July 2025.
8. "The Path to Adversarial LLM Math" at **Prompt||GTFO**, virtual, July 2025. [*presenting an offensive application of results found during the ASyMOB research*]
9. "Human-AI Hybrid Mathematical Discovery Workflow: Unifying Ramanujan's 17 Series for $1/\pi$" at **SCML**, July 2026.
10. "Human-AI Hybrid Mathematical Discovery Workflow: Unifying Ramanujan's 17 Series for $1/\pi$" at **ICML** 43, AI4Research workshop, **Oral**, July 2026.

Posters

M. Shalyt, R. Kalisch, E. Leibtag, I. Kaminer, "Efficient Symbolic Evaluation of D-Finite Functions" &
R. Kalisch, T. Monderer, E. Leibtag, S. Weinbaum, **M. Shalyt**, I. Kaminer, "An Infinite Family of Apéry-like Recurrences for Euler's Constant" &
H. Barkan, E. Leibtag, R. Kalisch, S. Weinbaum, **M. Shalyt**, I. Kaminer, "New Directions in Irrationality"
at **SCDDE**, Hagenberg, Austria, July 2026.

Special Activities

2005 – present. Member of the Israeli Physics Olympiad training team. Was part of the academic group in the 12th Asian Physics Olympiad (2011) and 50th IPHO (2019).
2014 – present. Frequent lecturer on science and technology at science fiction conventions, hackathons, and technical meetups.
2023 – present. Academic supervisor in the "Alpha" program for outstanding high-school students.