Evidence for Research criteria

Sub domain expertise: Conformal Prediction

Conformal Prediction was a relatively niche area in Machine Learning when I started working back in 2019 - while employed at Dell Technologies.

When working in industry, the focus area was mainly on patenting the intellectual property after *intensive research on the topic* supported by practical evaluation using proof of concepts.

23 Citations (research papers)

https://scholar.google.com/citations?user=F2eTslkAAAAJ&hl=en&oi=ao Citations **(23)**

[1] High density data storage in DNA using an efficient message encoding scheme
R Vishwakarma, N Amiri
International Journal of Information Technology Convergence and Services 2 … **12** 2012

[2] Reliable and secure memristor-based chaotic communication against eavesdroppers and untrusted foundries
R Vishwakarma, R Monani, A Hedayatipour, A Rezaei
Discover Internet of Things 3 (1), 2 **4** 2023

[3] Risk-Aware and Explainable Framework for Ensuring Guaranteed Coverage in Evolving Hardware Trojan Detection
R Vishwakarma, A Rezaei
2023 IEEE/ACM International Conference on Computer Aided Design (ICCAD) **3** 2023

[4] Message encoding in nucleotides
R Vishwakarma, S Vishwakarma, A Banerjee, R Kumar
Advances in Computing and Information Technology: First International … **2** 2011

[5] Machine Learning in Chaos-Based Encryption: Theory, Implementations, and Applications
J Hwang, G Kale, PP Patel, R Vishwakarma, M Aliasgari, A Hedayatipour
IEEE Access 11, 125749 - 125767 **1** 2023

[6] Attacks on continuous chaos communication and remedies for resource limited devices
R Vishwakarma, R Monani, A Rezaei, H Sayadi, M Aliasgari, ...
2023 24th International Symposium on Quality Electronic Design (ISQED), 1-8 **1** 2023

Table of Contents

Evidence 1: Published 2 research papers on Conformal Prediction.

The 12th Symposium on Conformal and Probabilistic Prediction with Applications (COPA 2023)

[1] **Vishwakarma, Rahul**, Mahshid Fardadi, and Bing Liu. "**Variable Sparing of Disk Drives Based on Failure Analysis.**" In *Conformal and Probabilistic Prediction with Applications*, pp. 172-174. PMLR, 2023.

This research paper was a joint endeavor with Dell Technologies during my tenure as a student at California State University Long Beach. **Dell Technologies sponsoring the conference registration fees** emphasizes the importance of the research and shows my persuasive multi-collaborative approach, bridging industry and academia.

[2] **Vishwakarma, Rahul**, Jinha Hwang, Soundouss Messoudi, and Ava Hedayatipour. "**Enterprise Disk Drive Scrubbing Based on Mondrian Conformal Predictors**." In *Conformal and Probabilistic Prediction with Applications*, pp. 56-73. PMLR, 2023.
I, as a **first author**, collaborated with a professor with Ph.D. in Conformal Prediction from **Université de Technologie de Compiègne**, Heudiasyc (France) and **Department of Electrical Engineering** (California State University Long Beach).

Evidence 2: Technical Program Committee and Reviewer for the COPA 2024.

I was appointed a TPC and Reviewer of the conference COPA 2024 (in Evidence 1) based on my expertise and earlier 2 papers published in COPA 2023.

Evidence 3: Mentored 2 students for publishing the paper at IEEE.

[3] Malawat, Rohit, Shrey Modi, and **Rahul Vishwakarma**. "**Tunable Sparing of Disks in a Cloud Data Center.**" In *2023 7th International Conference on Computer Applications in Electrical Engineering-Recent Advances (CERA)*, pp. 1-6. IEEE, 2023.

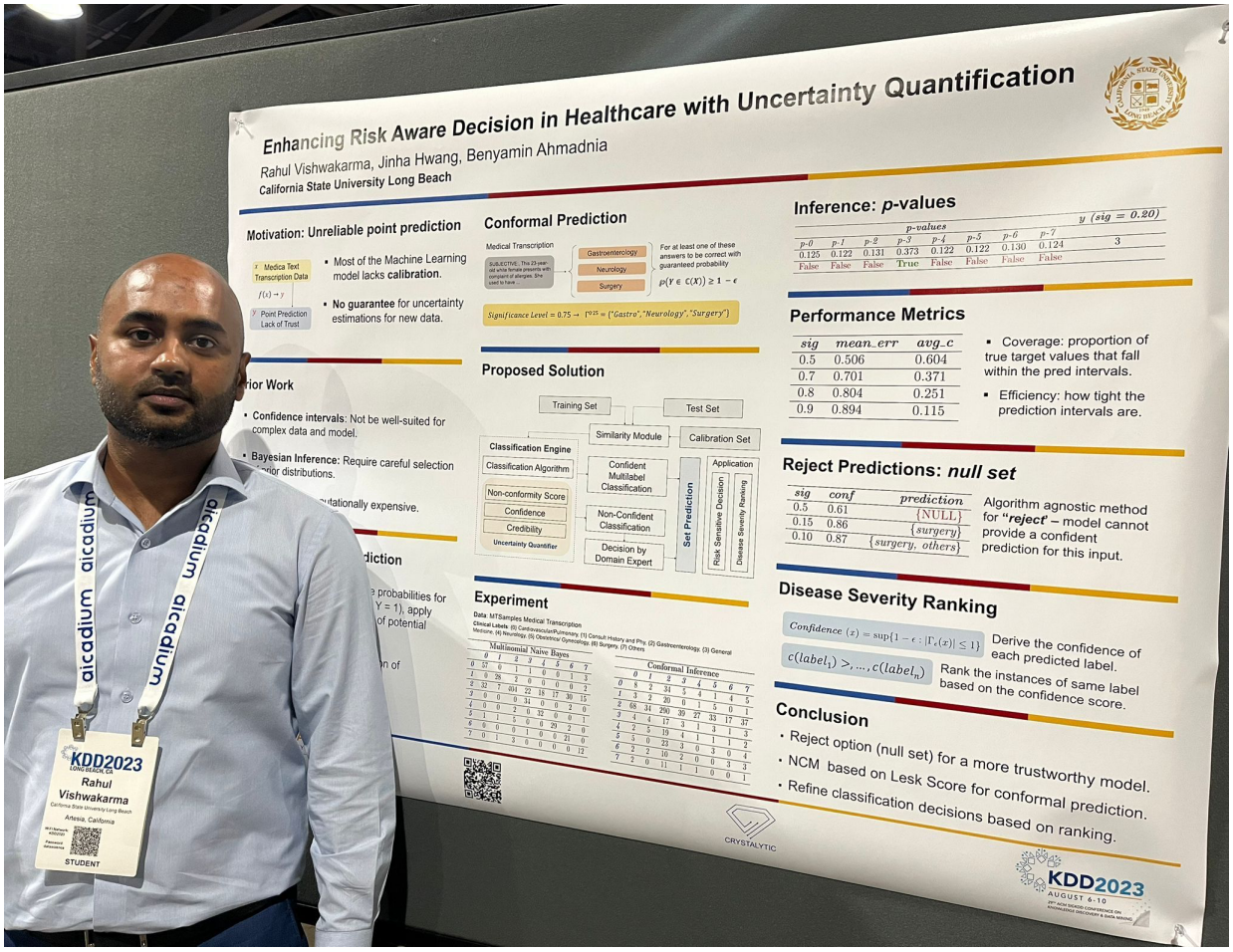
Evidence 4: Authored a book on conformal prediction.

[4] Conformal Prediction: An Inventor's Approach
The book reviewers from **Google**, **Amazon**, and **Dell Technologies**.

Evidence 5: Publication at KDD 2023

The acceptance rate is **23%**
GitHub: https://github.com/rahvis/KDD-2023
The work was done in collaboration with Crystalytic AI (https://www.crystalytic.ai)

[5] **Vishwakarma, Rahul**, Jinha Hwang, and Benyamin Ahmadnia. "**Enhancing Risk Aware Decision in Healthcare Through Probabilistic Modeling of Uncertainty.**" 29th ACM SIGKDD Conference on Knowledge Discovery and Data Mining: SoCal Data Science Day, https://doi.org/10.5281/zenodo.8170271.



Evidence 6: Publication at ICCAD 2023

The International Conference on Computer-Aided Design (ICCAD), a venerable event established in **1982**, holds significant importance within the academic and industrial realms of computer-aided design. With an impressive **h5-index of 43 and h5-median of 57**, ICCAD stands as a cornerstone in the field, facilitating the exchange of cutting-edge research and innovations. In response to the transformative influence of Artificial Intelligence (AI), ICCAD has dynamically broadened its scope. It now encompasses the latest advancements in AI technology within Electronic Design Automation (EDA) and hardware design. The conference's vitality is further underscored by its competitive acceptance rate, a testament to its rigorous selection process. Out of the 750 final submissions meticulously evaluated, only 172 papers were accepted for presentation—a notable **acceptance rate of 22.9%** (ICCAD 2023).

[6] **Vishwakarma, Rahul**, and Amin Rezaei. "**Risk-Aware and Explainable Framework for Ensuring Guaranteed Coverage in Evolving Hardware Trojan Detection**." In 2023 IEEE/ACM International Conference on Computer Aided Design (ICCAD), pp. 01-09. IEEE (**22.9% acceptance**)

Featured on **IEEE TV**

The paper received 3 **citations**, and one from **IEEE Access journal** with impact factor of 3.8

Mehmood, T., Latif, S., Latif, R., Majeed, H., & Malik, A. (2024). DRIFTNET-EnVACK: Adaptive Drift Detection in Cloud Data Streams with Ensemble Variational Auto-encoder Featuring Contextual Network. **IEEE Access**.

The research work was funded by NSF standard grant award amounting to **$173,000** (Grant #2245247 CRII: SaTC: RUI).

I was also a receipt of the ICCAD 2023 Student Scholar Program Travel Support Grant in the same year, totaling **$600.**

The significance of ICCAD is mirrored by its esteemed sponsors, including industry giants such as Cadence, Synopsis, AMD, FutureWEI Technologies, and EMPYREAN. The sponsorship from these prominent entities shows ICCAD’s relevance within the industry and demonstrates the recognition and support it garners from key stakeholders in the field.

Evidence 7: Publication at DATE 2024

The research work was funded by NSF standard grant award amounting to $173,000 (Grant #2245247 CRII: SaTC: RUI).

[7] **Vishwakarma, Rahul**, and Amin Rezaei. "Uncertainty-Aware Hardware Trojan Detection Using Multimodal Deep Learning." arXiv preprint arXiv:2401.09479 (2024).

Featured on **IEEE TV**

DATE 2024, held in Valencia, Spain from 25th to 27th March, stands as a testament to the enduring significance of **Design, Automation & Test in Europe**. With its inception dating back to **1998**, this year marks the **27th edition of the conference**. The conference holds immense value, underscored by its prestigious sponsors including **SIGDA** of the Association for Computing Machinery, the Electronic System Design Alliance, the European Design and Automation Association (**EDAA**), and the IEEE Council on Electronic Design Automation (**CEDA**). Additionally, technical co-sponsorship from ACM SIGBED, the IEEE Solid-State Circuits Society (**SSCS**), IFIP, and the Institution of Engineering and Technology (IET) further solidifies its significance within the industry.

Ranked #10 in top Engineering & Computer Science conferences according to **Google Scholar,** with an impressive **h-5 index of 49 and h-5 median of 64**, DATE 2024 continues to attract leading experts and researchers from around the globe.

The papers in Evidence 5 and 6 set as a foundation to my published **Thesis** work at California State University Long Beach.

Evidence 8: Publication at SYSTOR 2022

[8] **Vishwakarma, Rahul**, Bing Liu, Peter Gatsby, and Jinha Hwang. "**Selective scrubbing based on algorithmic randomness**." In *Proceedings of the 15th ACM International Conference on Systems and Storage*, pp. 141-141. 2022.

Acceptance rate is 22%

Evidence 9: Works on DNA based data storage.

My undergraduate thesis on DNA-based data storage was published as a conference paper as the first author and has **12** citations.

[9] **Vishwakarma et al**., "**High Density Data Storage in DNA Using an Efficient Message Encoding Scheme**", In International Journal of Information Technology Convergence and Services (IJITCS), vol. 2, Issue 2, Apr. 2012, pp. 41-46.

The **paper has received citations** (in year 2022) in the Journal **ACS Nano** (**Impact Factor 2022: 17.1, and CiteScore 2022: 25.4**) with authors from **University of Cambridge** (Cavendish Laboratory), **ETH Zurich** (Institute for Chemical and Bioengineering), and **Technical University of Munich**. This is **ranked #1 as per Google Scholar**'s top publication in nanotechnology (**h-5 index 220 and h5-median 290**).

Another noticeable **citation of this paper** is from **Microsoft Technology** Licensing LLC titled "Storage through iterative DNA editing", **as a non-patent citation** (Patent No.: US 10,669,558B2, filed 2017 and Issued 2020). The patent application includes filings with the World Intellectual Property Organization (WIPO) in 2017 (WO), the European Patent Office (EPO), the Spanish Patent and Trademark Office (OEPM), and the China National Intellectual Property Administration (CNIPA).

Evidence 10: Journal Papers in the domain of Chaotic Communications.

The research paper was published as **part of funding** provided by NSF Standard Grant (**$297,448**) program, abstract # 2131156 CISE-MSI: RCBPP-RF: SHF: Towards Efficient, Reliable, and Secure Chaotic Communications in Wearable Devices.

[10] **Vishwakarma, Rahul**, Ravi Monani, Ava Hedayatipour, and Amin Rezaei. "**Reliable and secure memristor-based chaotic communication against eavesdroppers and untrusted foundries.**" Discover Internet of Things 3, no. 1 (2023): 2.

Received **4** citations

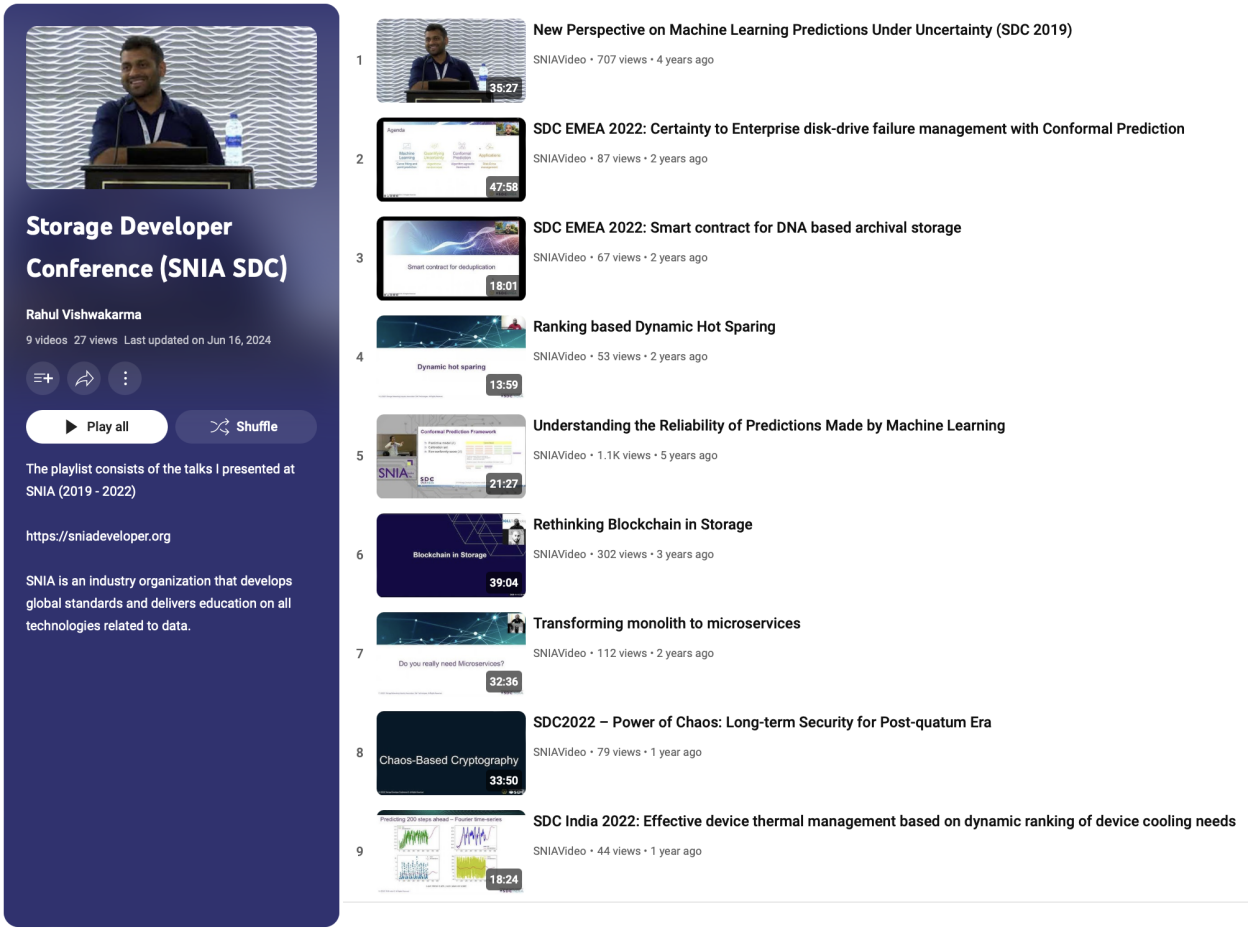
[11] Hwang, Jinha, Gauri Kale, Persis Premkumar Patel, **Rahul Vishwakarma**, Mehrdad Aliasgari, Ava Hedayatipour, Amin Rezaei, and Hossein Sayadi. "**Machine Learning in Chaos-Based Encryption: Theory, Implementations, and Applications**." *IEEE Access* 11 (2023): 125749-125767. (impact factor 3.9)

Received **1** citation from The **IEEE Access** Journal **impact factor is 3.9**

Evidence 11: Talks – Storage Networking Industry Association (SNIA) Developer Conference

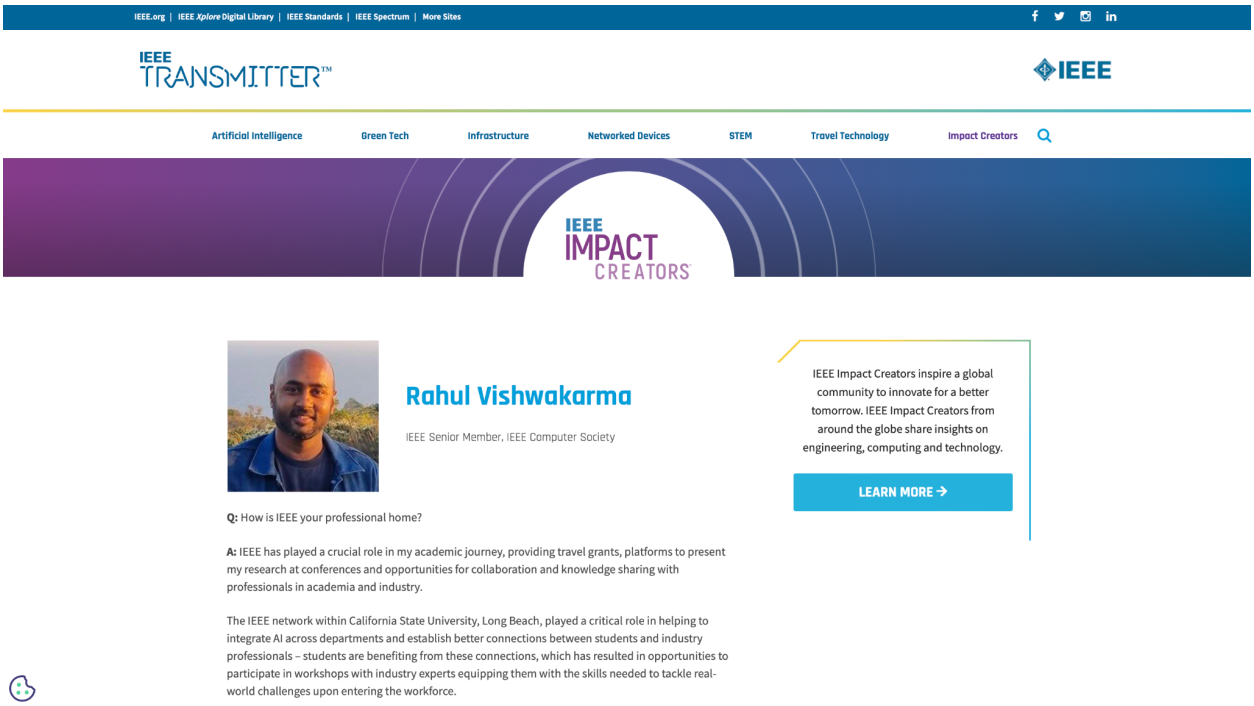
SNIA is an industry organization that develops global standards and delivers education on all technologies related to data.

A YouTube playlist of 9 talks delivered at SNIA SDC (2019 - 2023) can be found here.



Evidence 12: IEEE Impact Creator

Based on my research experience, I was made an [IEEE Impact Creator]



Evidence 13: Ambassador for ISSIP

Based on my contribution in academia and research I was made Ambassador for ISSIP

07-04-2024

Dear Rahul Vishwakarma

Congratulations on your appointment as an ISSIP Ambassador! The International Society of Service Innovation Professionals (ISSIP) is a global community that promotes understanding and excellence in service innovation to benefit people, business and society.

Your impressive achievements and contributions exemplify the qualities and excellence that are central to ISSIP's mission and have led to your selection for this prestigious role. The selection process is thorough, involving a nomination, followed by review and approval by ISSIP's Executive Leadership. This recognition highlights both your capabilities and potential to drive meaningful change within the ISSIP community and beyond. As an ISSIP Ambassador, you have the authority to propose ISSIP-sponsored initiatives, events or activities associated with the professional entity, conference or initiatives with which you liaise. You play the crucial role to ensure that ISSIP members are informed and can contribute. Your efforts will help ISSIP community develop as T-shaped service innovation professionals, gaining depth in their home associations and breadth across sister associations.

ISSIP is proudly associated with a league of distinguished organizations such as the IEEE, the Association for the Advancement of Artificial Intelligence, the California Center for Service Science, the Cambridge Service Alliance UK, Swiss Institute of Service Science, among many others. You can find a full list of our partner organizations here.

We will officially announce the full complement of ISSIP Ambassadors early in 2025, as there are still nominations under review for inclusion. In the meantime, I offer you my congratulations and the attached certificate to commemorate your approval in this important ISSIP connector role. We plan to recognize your achievement at the next ISSIP Progress Call with its Board of Directors on July 31, 2024, from 3-4 pm EDT. Additionally, you have been issued an ISSIP Excellence in Service Innovation Digital Certification. This certification can be added to your LinkedIn profile by following these instructions.

Once again, congratulations on this significant achievement. We look forward to your contributions as an ISSIP Ambassador and the positive impact you will make in the service innovation community.

Sincerely,

Deb Stokes
President, ISSIP

The International Society of Service Innovation Professionals

CERTIFICATE

OF APPRECIATION

In the Name and By the authority of The International Society of Service Innovation Professionals, this certificate is awarded to

Rahul Vishwakarma

For serving as an **ISSIP AMBASSADOR**

Deb Stokes	Michele Carroll	Christine Ouyang
President, ISSIP	Executive Director, ISSIP	Lead, ISSIP Ambassadors
Leader External Research, Office of the CTO, Dell Technologies	President, Carrollco Marketing Services	Distinguished Engineer, Master Inventor IBM

July 04, 2024

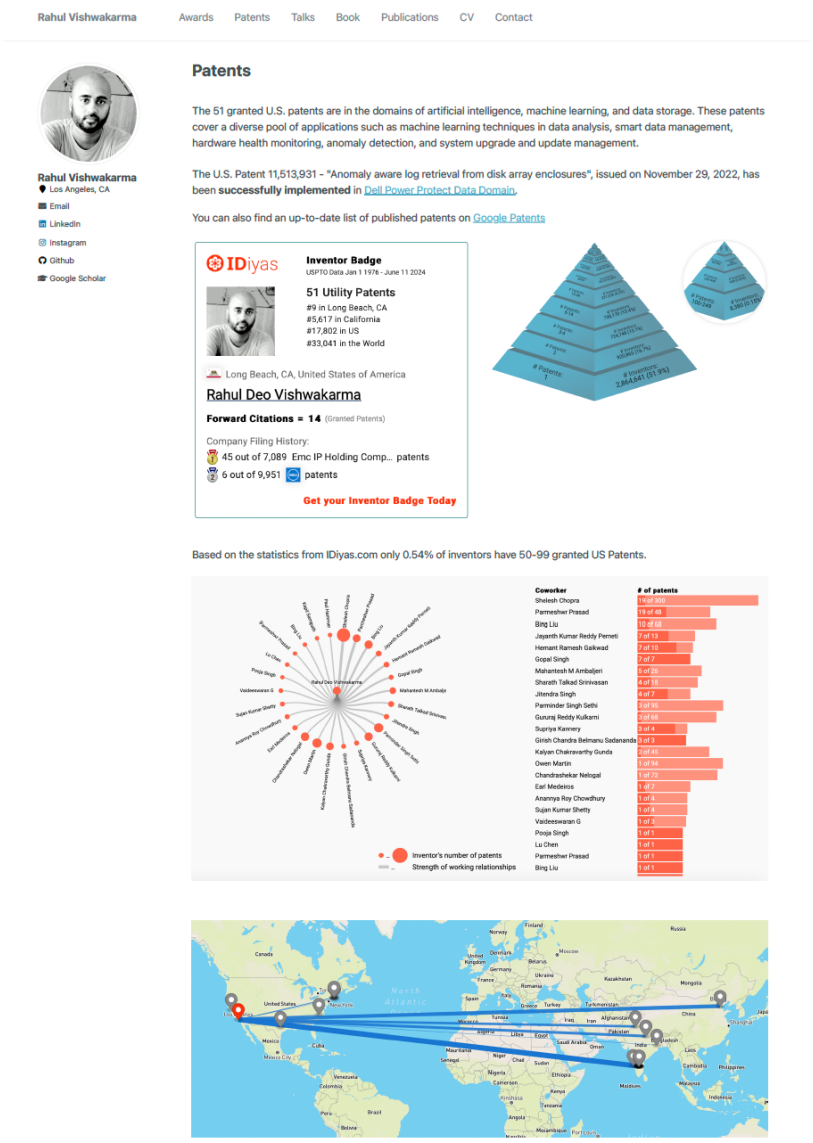
Evidence 14: Judge for ISEF Society of Science

Evidence 15: Outstanding Research Scholar Award (1 among 5500 graduate students).

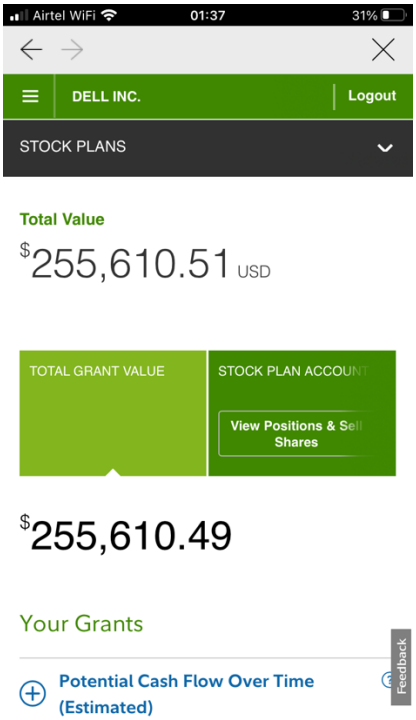
Evidence 16: Granted US Patents (51) - consequence of research.

https://rahvis.github.io/patents/

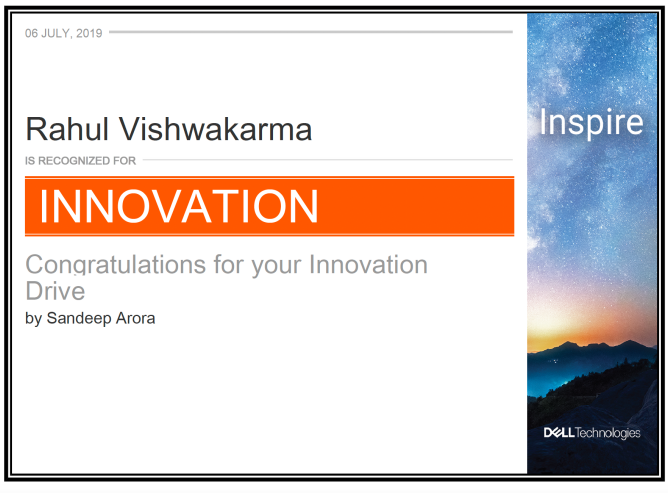
https://patents.google.com/?inventor=%22Rahul+Deo+Vishwakarma%22,Rahul+Vishwakarma&num=100&sort=new&dups=language&clustered=true



Evidence 17: Patent Awards at Dell



Evidence 18: Innovation Award



Evidence 19: Patent Mentoring

Evidence 20: CSULB Research Scholar Award

CALIFORNIA STATE UNIVERSITY
LONG BEACH
Office of Graduate Studies

March 02, 2024

Dear Rahul Vishwakarma,

The Dean of Graduate Studies, Dr. Jody Cormack, and I, the Associate Dean of Graduate Studies, would like to formally congratulate you on achieving the *Outstanding Graduate Research, Scholarly, and Creative Activity Award* for your exceptional work as an MS in Computer Science student.

Your 66 patents, research in hardware Trojan detection, and creation of the AI Research Club contribute significantly to the field and beyond. This Outstanding RSCA award is much deserved and adds to your long line of impressive achievements. We have no doubt that there are more to come.

contributes significantly to the field and beyond. This Outstanding RSCA award is much deserved and adds to your long line of impressive achievements. We have no doubt that there are more to come.

As you close out your master's program at CSULB, with publications and manuscripts in various stages, we would like to invite you to share your research findings in the 4th Annual CSULB Grad Slam competition. We hope to see your submission!

We wish you the very best as you embark on the next stage of your academic career and hope that you remain connected to Graduate Studies at the Beach to share future achievements.

Kindest Regards,

Dr. Dina Perrone
Associate Dean of Graduate Studies

Jody Cormack

Dr. Jody Cormack
Vice Provost Academic Programs &
Dean of Graduate Studies