TAN CHIEN HAO

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ACADEMICS

Olympiad

International Physics Olympiad (IPhO) - Silver (2021)
European Physics Olympiad (EuPhO) - Honourable Mention (2020)
Singapore Physics Olympiad (SPhO) - Gold & Top in Experiment (2020), Silver (2019)
National Olympiad in Informatics (NOI) - Gold & Top in Secondary School Category (2018, 2019)
Singapore International Math Olympiad (SIMO) Training Team - Junior (2017), Senior (2017)

Leadership

Chairman of Raffles Institution (RI) Infocomm Club (2018)
Prefectorial Board (2018-2019)

Physics Research

2017 (SBSMP) - Wireless Energy Transfer via Resonant Inductive Coupling (Singapore Science and Engineering Fair (SSEF) Participation)
2018 (SMP) - Magnetism in 2D Arrays (SSEF Bronze, Youth Science Conference (YSC) Gold, 3M Best Project, School's Research Education (RE) Gold, Participated in International Science Youth Forum (ISYF), Participated in Kobe Super Science High (SSH) Science Fair)
2019 (DSO) - Tesla Coil Drivers (SSEF Participation)
2020 (SRP) - Topology & Geometry of 3-Band Models (SSEF Gold, Intertional Conference of Young Scientists (ICYS) Silver), currently working on arxiv preprint

Awards

Lee Kuan Yew Maths & Science Award (2020)
DSTA JC Scholarship
Top in Computer Elective Programme (2017, 2018)

EXPERIENCE

Internships

2019 (Sec 4) - TinkerTanker (3 weeks)

- Worked on Ruby on Rails inventory system

2019 (Sec 4) - A*STAR Institute of High Performance Computing (IHPC) (3 weeks)

- Worked with Prof. Lee Ching Hua on Theoretical Physics (continued project after internship)
- Used Mathematica

2019 (Post O-levels) - Defence Science Organisation (DSO) (2 months)

- Worked on Triggered Spark Gaps and Solid State Tesla Coil (SSTC) drivers (continued project after internship)
- Used OpenSCAD, Fusion360, EasyEDA, LTspice
- Results: https://youtu.be/GLKPK-lLGiQ

2021 (Post A-levels) - Defence Science Organisation (3 months)

- Worked on Radio Imaging (details confidential)
- Used Spyder (Python), OpenCV in C++

Projects

TwigSlot - Knowledge Graph Builder

- Site: `https://twigslot.com/explore`
- Tech Stack: Neo4J, Flask, Ory (Kratos, Oathkeeper, Keto), VueJS
- Hosting: Digital Ocean (DO) Kubernetes (K8) Cluster, Traefik, Cloudflare
- Goal: Make it easier to share a web of links

Tick Ninja (Maintainer) - Notes Sharing Site

- Site: `https://tick.ninja`
- Tech Stack: NodeJS, Cloudflare R2
- Hosting: DO K8, Traefik, Cloudflare
- Built by my seniors, I migrated data from Redis to Postgresql, from Dropbox to AWS to R2, and maintaining it. Also gained experience handling SSL ACME challenges in K8 `https://tch1001.github.io/categories#SSL`.

SPhL SRE

- Site: `https://sgphysicsleague.org/`
- Scaled the site to serve over 3K participants
- Tech Stack: NodeJS, Cloudflare, DigitalOcean

Experimental/Weekend Projects

Kurento Webcam Streaming

- Experimented with WebRTC
- `https://github.com/tch1001/webcam-kurento`

MissilesIO

- Made an online game using Socket IO
- `https://github.com/tch1001/missilesIO`

Handwritten Math Symbols OCR

- Sec 3 school project on ML
- `https://github.com/tch1001/machine-learning`

Ory Keto Explorer

- Understanding Google Zanzibar better with interactive web client interface to Ory Keto
- `https://github.com/tch1001/keto-explorer`

Botting

- Worked with Selenium Grid, CAPTCHA solvers, proxies

Small Hobby / Prototype Mobile Apps in

- Flutter `https://github.com/tch1001/hoo-app`

- <mark>Native Android (Java)</mark> when I was a kid
- <mark>React</mark>

Teaching

Informatics Olympiad (2018)

- RI Infocomm Club Chairman - Weekly Training, November Course
- Singapore JC/Secondary Schools - NUS December Course
- NOI Group/1-1 Tutoring
- Youtube

Physics Olympiad / H3 Physics

- National Team Talks: Relativity (2023), Thermodynamics (2023)
- SJPO/SPhO Group/1-1 Tutoring/Coach
- SYPT Coach (2023)
- Youtube

Volunteering

- Beach Cleanup
- Peer Tutoring
- Classroom Teaching

INTERESTS

Making Educational Videos:

- Personal / Unedited `https://youtube.com/tanchienhao`
- Coding `https://youtube.com/@tchcodes319`
- Physics Olympiad / H2 Physics `https://www.youtube.com/@tch1001`

<mark>Microblogging</mark>: `https://t.me/tch1011`
Cybersecurity (Pentesting, Binary Exploitation, Hardware)
Theoretical Physics (cond-mat, hep-th, atom-ph)
Electrical Engineering (Power Electronics, Tesla Coil)
Robotics (Modular, Prosthetics, Electropermanent Magnets)
Embedded (Linux Kernel / FPGA)

- Kernel-related blogs `https://tch1001.github.io/categories#kernel`
- Arch on Mac

Music (EDM, DJ, FL Studio)
Theoretical CS (Complexity, Computability, Functional Programming, Homotopy Type Theory)
Pure Math (Proof Assistants, QFT/String-inspired Conjectures)
<mark>DevOps (Kubernetes)</mark>
<mark>GTO Poker</mark>

PERSONAL TRAITS

Curious

Enjoy learning

<mark>Super self-driven</mark> when passionate about something