Introduction about myself

Wenwen Zhang

Keywords: Creative, passionate, leadership

Research interests: AI + Optics, machine learning, biomedical/biology data processing, Optical engineering

Bio

Wenwen Zhang received her B.Sc. degree from **Tianjin University, Tianjin, China**, in 2020. She will receive her master degree (research based) at the **University of British Columbia, Vancouver, Canada**. She is interested in **AI + Applied Optics, biomedical/biology data processing, optical engineering**. From January 2016 to March 2020, she was with Tianjin University, where she was involved with microwave engineering with machine learning (dual-band bandpass filter applied for 5G sub-6 GHz base station). From September 2020, her research focuses on machine learning based ML auto-driven silicon photon design (supervised by Prof. Lukas Chrostowski), wearable sensor data process and biomedical information process (Supervised by Prof. Peyman Servati and Prof. Calvin Kuo). From Sept 2022 to April 2023, she is a visiting student (supervised by Dr. Grigory Tikhomirov) at the University of California, Berkeley. She is working on implementing automatic workflow label-free DNA microscopy sensing by using machine learning.

- **09/2020-06/2023 MAS.c Electrical & Computer Engineering, University of British Columbia (UBC)**
  - Research Assistant at flexible electronics and energy lab
  - Research Assistant at Silicon photonic group
- **09/2022-04/2023 Visiting Graduate Researcher, EECS, University of California, Berkeley(UCB)**
  - Visiting research student (Friedman Scholar)
- **08/2016-06/2020 BS.c Electrical & Computer Engineering, Tianjin University (TJU)**
  - Sub area: Electric engineering
  - Overall GPA: 3.9/4.0
  - Rank 8/104

Course highlights: Introduction to Quantum Computing | Active/Passive silicon photonic devices | Signal processing and systems | Deep Learning | Digital Signal Processing | Microwave engineering | Fields and waves of electromagnetic

Berkeley UNIVERSITY OF CALIFORNIA

UBC THE UNIVERSITY OF BRITISH COLUMBIA

天津大学 Tianjin University

Awards

• UBC Faculty of Applied Science Excellent Graduate Award - $9000/year
• UBC Friedman Award for Scholars in Optics+Health - $38000/7 months
• UBC International Tuition Award - $9000/year
• UBC Research Assistance Graduate Award - $24000/year
• Hong Kong Ph.D. Fellowship Scheme MS/Ph.D. (HKPFS) (declined) $ 41,690/Stipend
• Exemption from entrance examination for MS/Ph.D. Program (decline)
• China College Students Integrated Circuit Competition (the north region), (Top 1 of 140)
• China College Students Integrated Circuit Competition (Final), Second Prize (1%) ￥6000
• USRP Excellent Project Award of Province (Top 1% in Engineering department) ￥8000
• First Prize in China Mathematical Contest in Modeling (5% - Tianjin area).
• The first class “Merit Student” Scholarship of Tianjin University (3 years)
• Career Certification of HCNA Huawei (Second prize)
• “Mathematical Contest in Modeling Certificate of Achievement (MCM)”, Honorable Mention

Certificates and Workshops

- 2022 Stanford AI + Health online conference
- 2022 NeurIPS and Machine Learning for Health (ML4H) (New Orleans)
- 2022 SPIE Photonic + Optics conference (San Diego)
- The SmarT Innovations for Technology Connected Health (STITCH)
- 2021 SIEPIC Active Silicon and Laser Photonics Workshop
- 2020 SIEPIC Passive Silicon and Laser Photonics Workshop
- QSciTech-QuantumBC Virtual Workshop: Gate-based Quantum Computing Using IBM-Q
- 2019/2020 International Workshop on Microwave and Microsystems

Publications and Patents

2021-2023 MASc works *** = equal contributions**

- Tashakori A*, **Zhang W***, Wang Z J, et al. **SemiPFL: Personalized Semi-Supervised Federated Learning Framework for Edge Intelligence**[J]. ***IEEE Internet of Things Journal*, 2023. doi: 10.1109/JIOT.2022.3233599.**
- **W. Zhang*,** J. Wang*, C. Silva, and L. Sigal. **Make Unsupervised Clustering Discriminative and Informative for Source-Free Domain Adaptation: A Feature Graph Guided Contrastive Learning Method** ***(In progress for 2023 NIPs).***
- **W. Zhang*,** A. Tashakori, Z. Jiang, A. Servati, C. Kuo, and P. Servati. **Endorse Vision to Textile: 3D Human Pose Generation from Tactile Knee Sleeves. (*In progress for 2024 CVPR).***
- **W. Zhang*,** C Kuo and P Servati. **L4P: A Method for Learning Pathological Gait Parameters from wearable sensors for Parkinson's patients**. ***IEEE Transactions on Biomedical Engineering (Under review).***
- A. Tashakori, **W. Zhang**, Z. Wang, , A Servati and P. Servati ***Stretchable Smart Textile Gloves for Dynamic Tracking of Articulated Hands. (Reviewing by Nature Electronics)***
- **W. Zhang***, H. Zhang, R. Gordon, L. Chrostowski, P. Servati, **Probing Ring Resonator Sensor Based on Vernier Effect**. ***Accepted by 2023 IEEE Silicon Photonics Conference (Washington, US).***
- **W. Zhang***, J. Wang, L. Chrostowski, N Jaeger and P. Servati. **Weight Bank Addition Photonic Accelerator for Artificial Intelligence**. ***Submitted to Optics Express (Under review)***
- **W. Zhang***, H. Zhang, L. Chrostowski, N Jaeger and P. Servati. **Ring resonator sensor based on Vernier Effect**. ***Submitted to Optics Express (Under review/2nd revision)***

- **W. Zhang*,** Ma K*, Zhang H, et al. **Design of a compact SISL BPF with SEMCP for 5G Sub-6 GHz bands**[J]. ***IEEE Microwave and Wreless Components Letters,*** 2020, 30(12): 1121-1124.
- Zhang H, Ma K, **Zhang W**, et al. **A Nover Self-packaged DBBPF with multiple TZs for 5G sub-6GHz applications**. ***Microw Opt Technol Lett. 2022, 0895-2477, doi: 10.1002/mop.33455.***
- Ma K, Zhang H, Fu H, **Zhang W**. **5G dual passband filter based on dielectric integrated suspension line**. ***CN 201910528184. (CN Patent)***
- Ma K, **Zhang W**, Fu H, Zhang H. **Band-pass filter based on 5G double-frequency dielectric integrated suspension lines**. ***CN 201910862414. (CN Patent)***

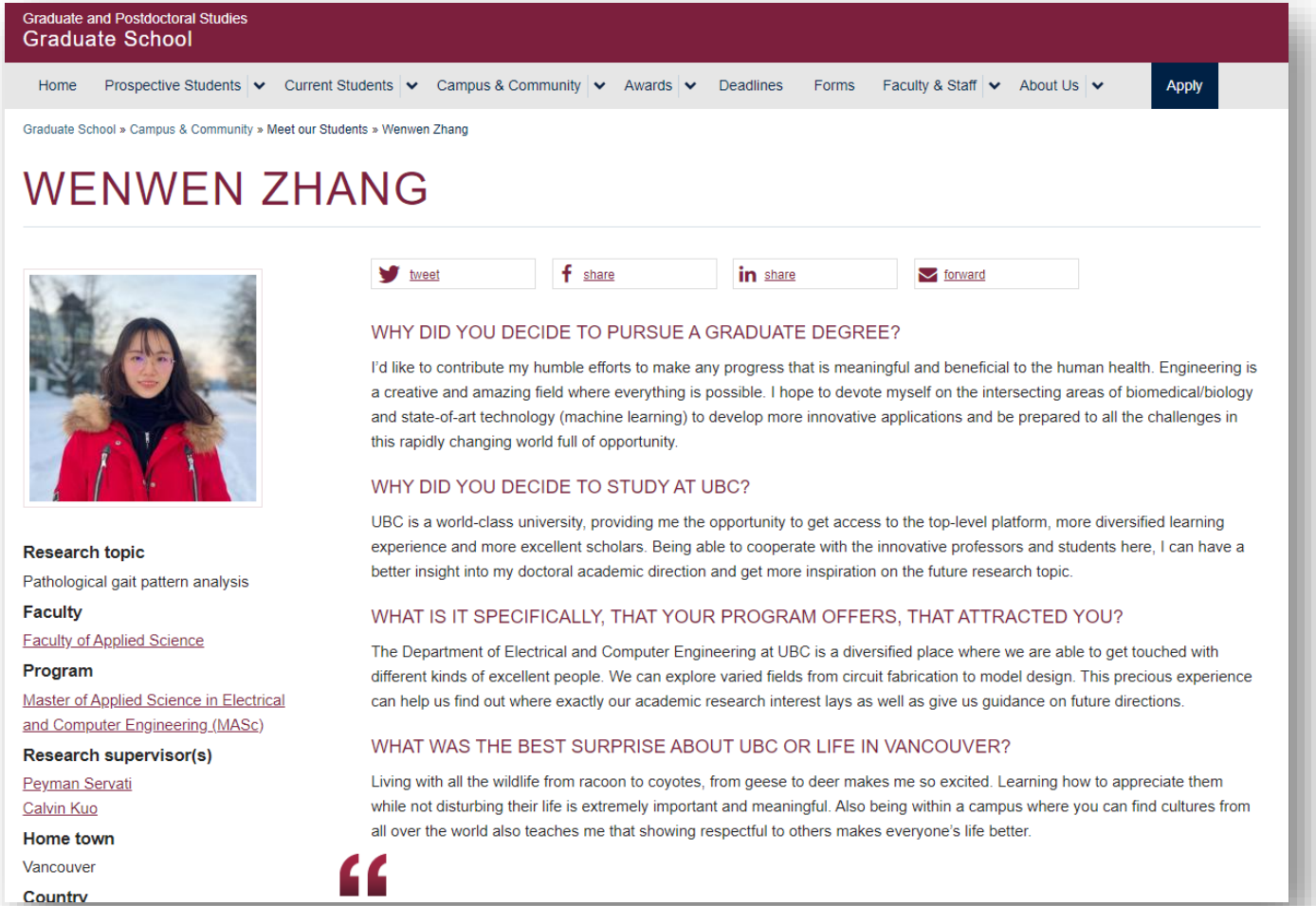
2018-2020 Undergrad works

Conferences and Presentations

- **W. Zhang*,** et. al, **Probing Ring Resonator Sensor Based on Vernier Effect. Poster/paper –** Accepted by 2023 IEEE Silicon Photonics Conference (Washington, US).

- **W. Zhang***, et. al, **A Flexible Sensor System for Lower Body Locomotion Estimation Using Machine Learning**. *Poster - 2022 Biomedical Engineering Society Annual Meeting*. (Link).

- **W. Zhang***, et. al, **A Wearable Sensor System for Measuring Pathological Gait Parameters**. *Poster - 2022 Biomedical Engineering Society Annual Meeting*. (Link).



UBC Friedman Award for Scholars (The first female student at ECE department)

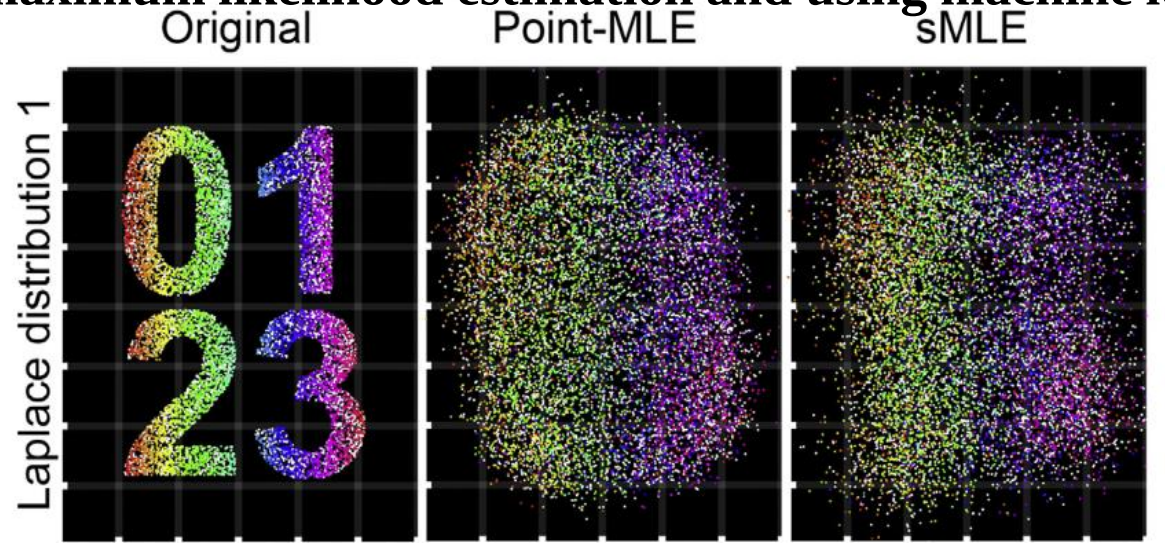
Ti Lab

Supervisor: Prof. Grigory Tikhomirov

Electronic Engineering and Computer Science Department, Graduate Scholar (funded by Canada health care)

DNA Microscopy Imaging by Machine Learning *09/2022-04/2023*

- **Post-processing cell chemical reaction bio-information and locating molecule relative position through spectral maximum likelihood estimation and using machine learning. (Python)**



- ***Flexible Electronics and Energy Lab (FEEL)*** **Supervisor: Prof. Peyman Servati**

Electronic and Computer Engineering Department, Research Assistant

Personalized Semi-supervised Federated Learning for Embedded Intelligence *09/2021-01/2022*

- Federated learning method considering large proportion of no-label data with huge data heterogeneity at different device end.

Wearable Sensor System for Gait Disorder Patients *01/2022-09/2022*

- Developing real-time algorithms to predict gait parameters of patients with disorders (Parkinson, stroke & geriatric).

Smart Knee Sleeves Based on Flexible Sensors 12/2021-06/2022

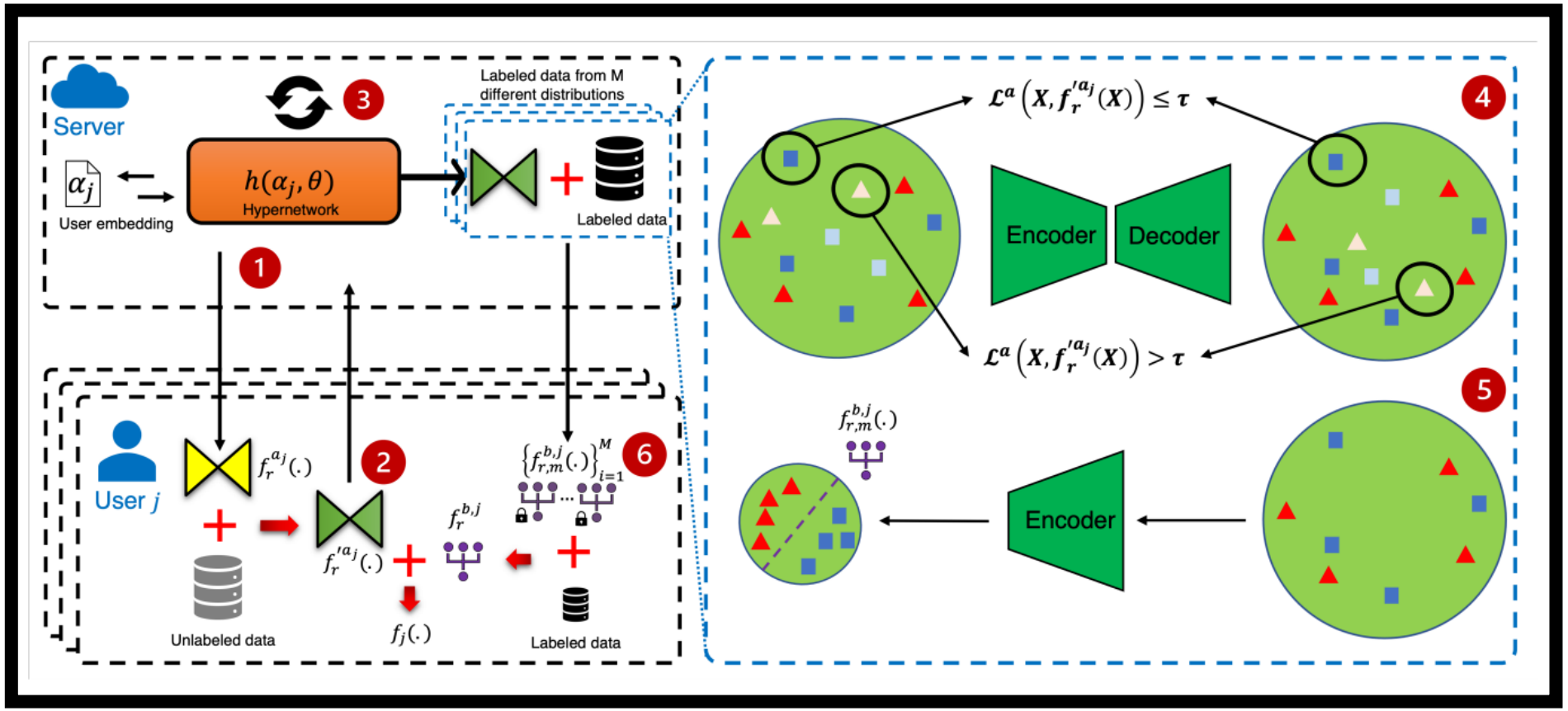
- Lower extremity estimation & movement tracking & muscle condition monitoring by data from flexible sensors (stress, temperature, etc.) integrated into knee braces. (prepare for CVPR)

Intelligent Glove with Embedded Wearable Sensors. 12/2021-03/2022

- Hand gesture reconstruction of post-stroke patients to assess upper extremity function and help motivate recovery progress. (submitted to Nature Electronics)

SemiPFL: Personalized Semi-Supervised Federated Learning Framework for Edge Intelligence

- With the evolution of sensor and wearable technologies, tremendous data from numerous clients have contributed to various datasets with huge heterogeneous. To take advantage of those unlabeled data, semi supervised is proposed for this special situation.
- High quality dataset with elaborate labels are usually confined to a small portion of the whole data. To make accurate estimations for unlabelled data, we initialize a hyper network at the central server, and keep updating network parameters while sending personalized encoder to different client during each iteration.



Working Experience

Texavie Technologies, Inc. - R&D Intern, Hardware and Data Processing (12/2021-06/2022)

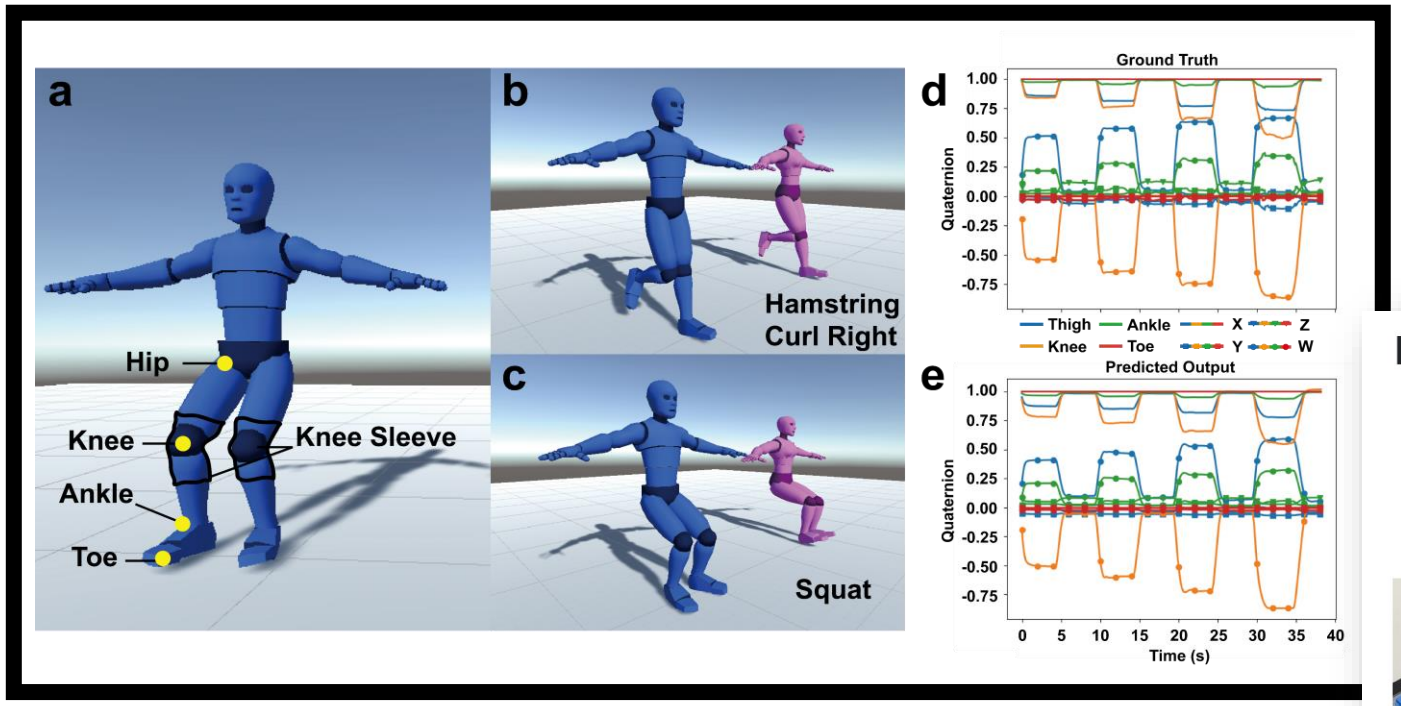
- **Smart Knee Sleeves Based on Flexible Sensors 12/2021-06/2022**
  Lower extremity estimation & movement tracking & muscle condition monitoring by data from flexible sensors (stress, temperature, etc.) integrated into knee braces. This work is preparing for the 2024 CVPR.

- **Intelligent Glove with Embedded Wearable Sensors. 12/2021-03/2022**
  Hand gesture reconstruction of post-stroke patients to assess upper extremity function and help motivate recovery progress. This work has been submitted to Nature Electronics.

texavie

A Flexible Sensor System for Lower Body Locomotion Estimation

- Knee sleeves with strain sensors around thigh and shank can detect muscle activation during movements. Combined with IMUs located around knee, it's able to estimate lower body locomotion with a pair of knee sleeve only.
- The accuracy on major joints in lower body would be higher than insignificant joints. For example, the toe joints prediction is worse than knee and thigh joint angel estimation.

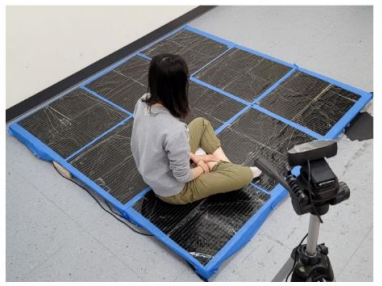


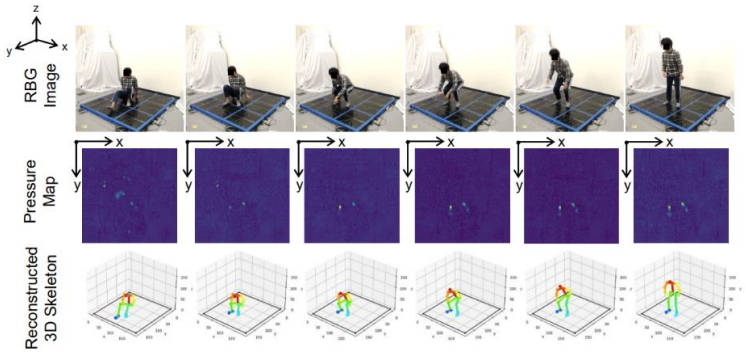
STITCH

UBC THE UNIVERSITY OF BRITISH COLUMBIA

IntelligentCarpet: Inferring 3D Human Pose from Tactile Signals

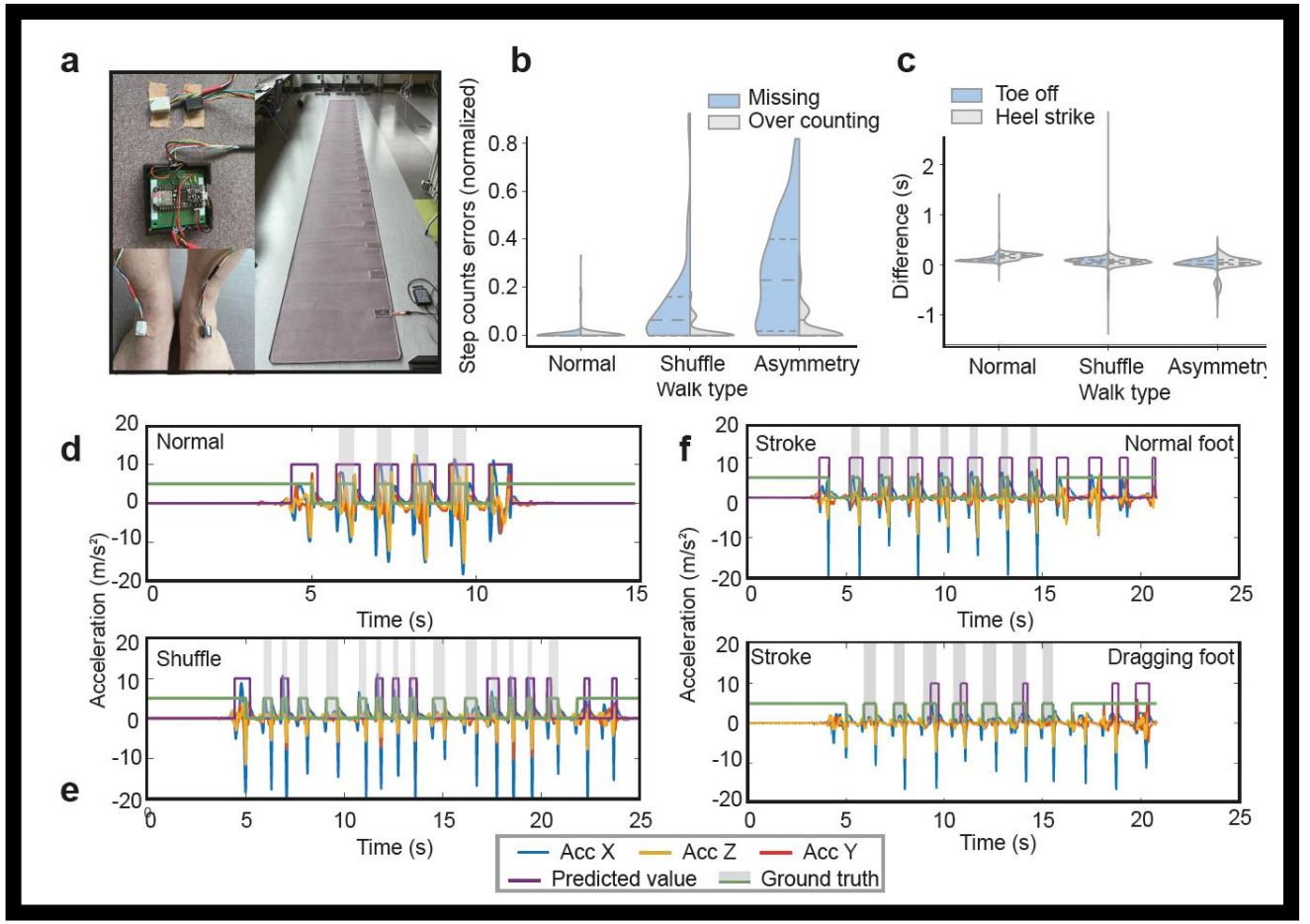
Yiyue Luo Yunzhu Li Michael Foshey Wan Shou Pratyusha Sharma
Tomas Palacios Antonio Torralba Wojciech Matusik





A Wearable Sensor System for Measuring Pathological Gait Parameters.

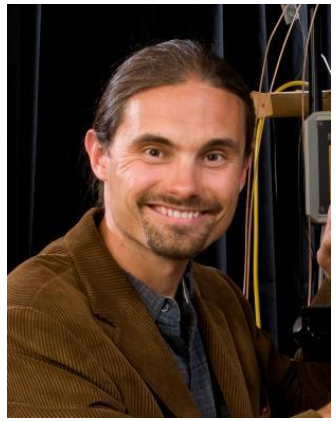
- Gait parameters such as step length and step time are important indicators to monitor patient progress.
- The prediction accuracy is largely dependent on the first step segmentation results. Missed steps or over counted steps will heavily mess up integration results in downstream tasks. Even foot segmentation is correct, because of the lacking in magnetometer, it's still hard to get accurate result for step length. Due to patients' gaits have different characteristics, it's also hard for traditional ways to set velocity threshold in estimations process, which will lower accuracy as well.



THE UNIVERSITY OF BRITISH COLUMBIA

STITCH

Microsystems and Nanotechnology (MiNa) Optical Lab (2020/09-2022/01)



Electronic and Computer Engineering Department, UBC
Instructor: *Prof. Lukas Chrostowski*

Weight Bank Addition Photonic Accelerator in Neuromorphic Networks

- Implementing automatic workflow for silicon photonic circuit design (simulation track)
- Designing and implementing cascaded micro-ring weight bank reporting the observations of weight addition and subtraction in neuromorphic networks based on silicon on insulators (SOI).
- Extended FSR Micro-Ring Modulator on SOI.
- Designed, fabricated and tested parallel and cascaded ring resonators exhibiting Vernier effect and extended free spectral range (FSR).

NSERC CRSNG

SiEPIC Kits

Stewart Blusson Quantum Matter Institute
THE UNIVERSITY OF BRITISH COLUMBIA

SiEPIClab Public

Python code for Silicon Photonics Automated Probe stations

Python 19 17 1 (1 issue needs help) 0 Updated last week

SiEPIC_EBeam_PDK Public

SiEPIC EBeam PDK & Library, for SiEPIC-Tools and KLayout

Python 155 126 49 (6 issues need help) 0 Updated last week

SiEPICfab-EBeam-ZEP-PDK Public

SiEPIC Program EBeam PDK for the ZEP process

Python 5 4 1 (1 issue needs help) 0 Updated 2 weeks ago

SiEPIC-Tools Public

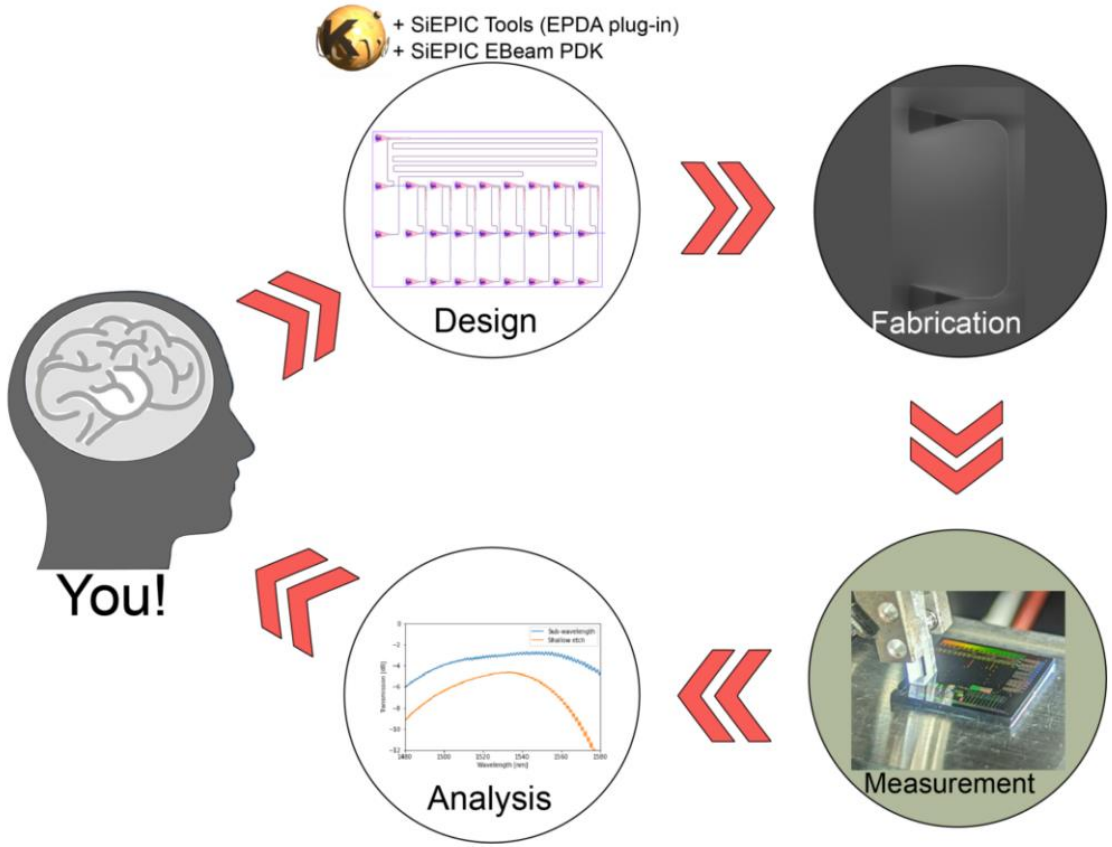
Package for KLayout to add integrated optics / silicon photonics functionality (waveguides, netlist extraction, circuit simulations, etc)

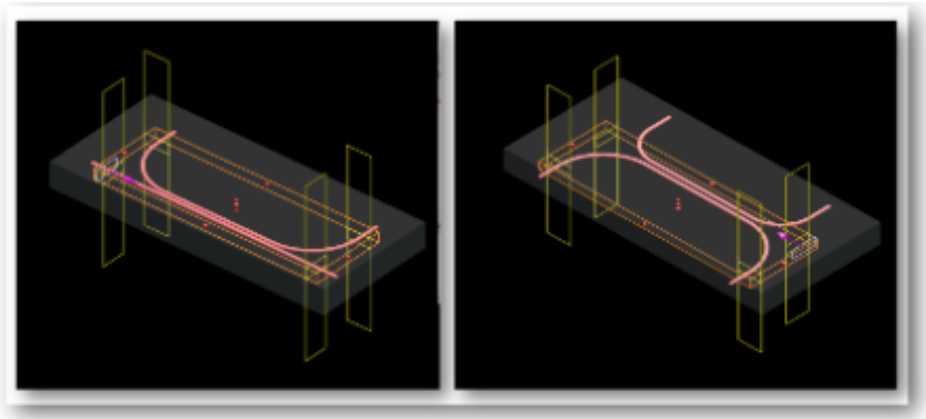
Python 111 77 69 (3 issues need help) 6 Updated 2 weeks ago

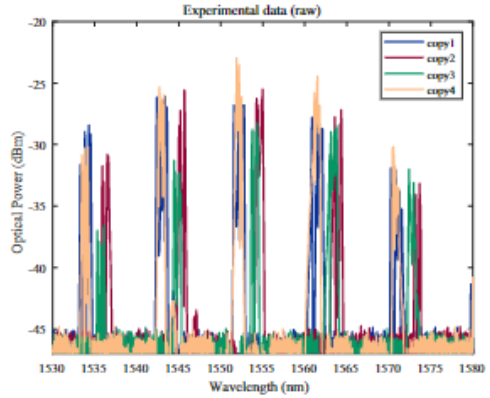
SiEPICfab_Shuksan_PDK Public

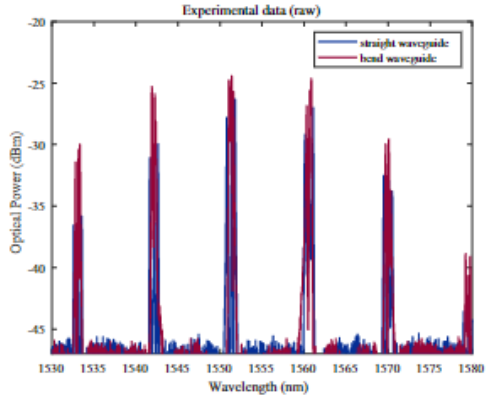
The SiEPICfab / Applied Nanotools / Dream Photonics laser integration MPW run

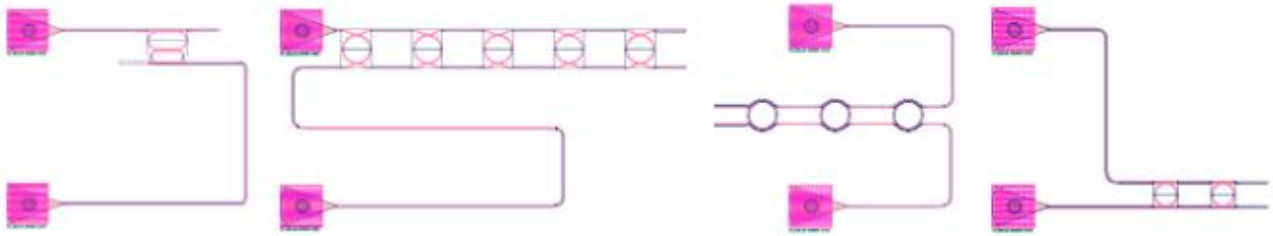
Python 2 5 0 0 Updated 3 weeks ago

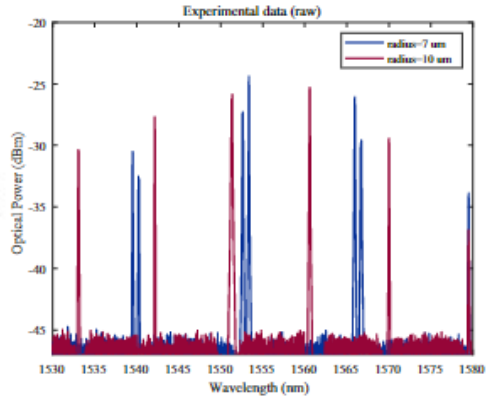


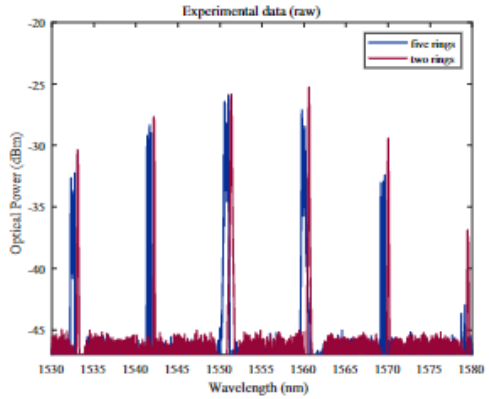












https://github.com › SiEPIC ▾ 翻译此页

SiEPIC - GitHub

SiEPIC-Tools: A python package that enables electronic-photonic design automation (EPDA) functions on the free open-source layout editor KLayout.

https://github.com › SiEPIC › SiEPIC_EBeam... ▾ 翻译此页

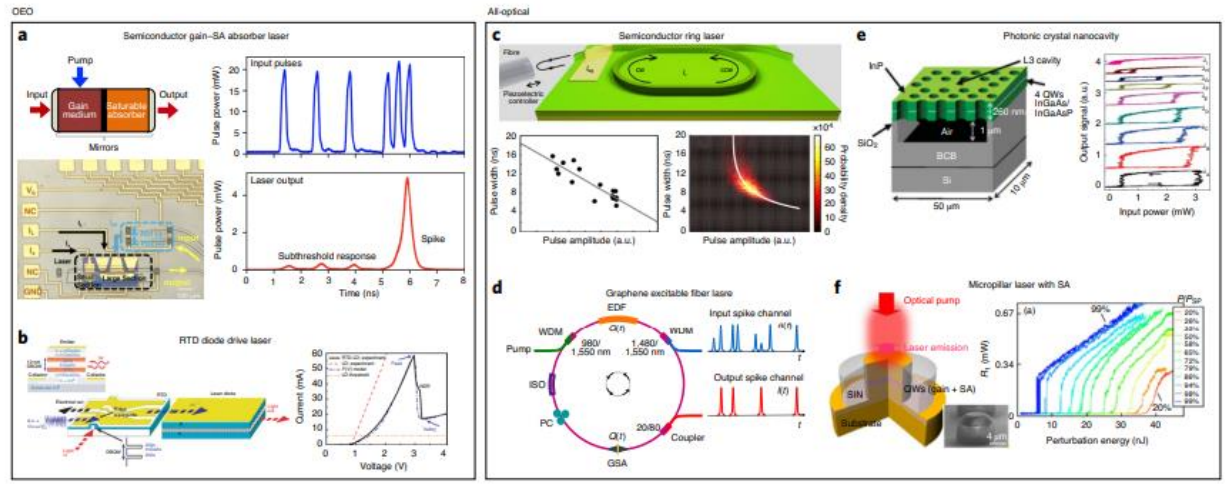
SiEPIC/SiEPIC_EBeam_PDK - GitHub

The SiEPIC-Tools package includes: · Netlist generation · Creating a Spice netlist suitable for for circuit simulations. · Menu item "Lumerical INTERCONNECT" will ...

https://www.siepic.com ▾ 翻译此页

SiEPIC Kits | Silicon Photonics Design | Vancouver

We help you realize innovative solutions using silicon photonics technology. We will collaborate with you through the entire product development cycle for your ...



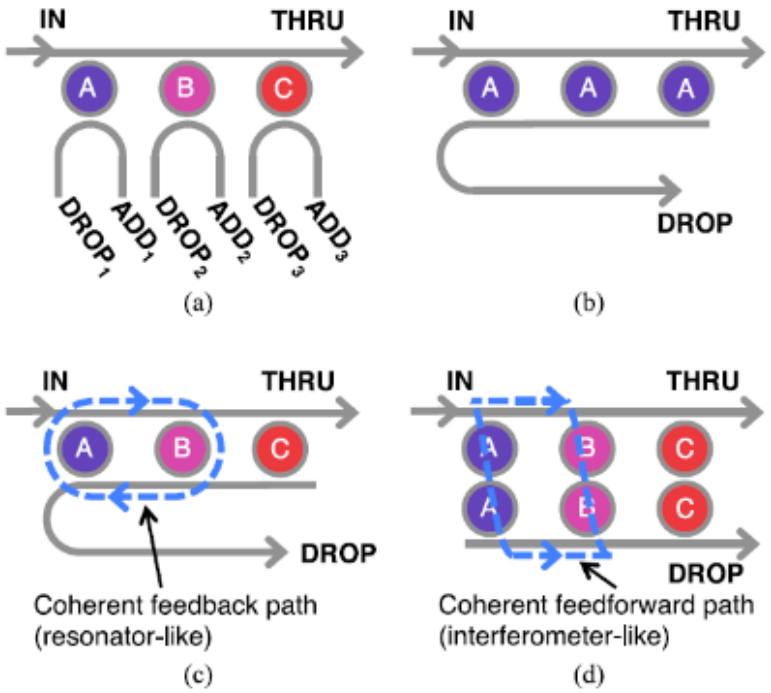
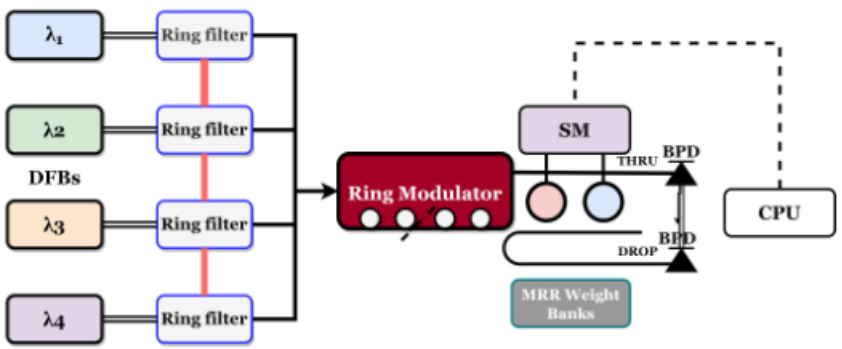
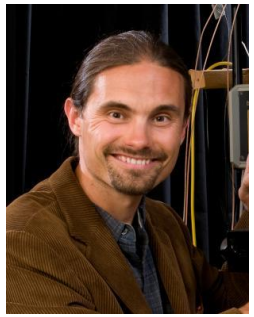


Fig. 1. Different types of weight bank [24]. (a). Add-drop multiplexer. (b). Dual-band double channel side-coupled integrated spaced sequence of resonators (SCISSORs). (c). 1-pole MRR filters. Each MRR controls a separate WDM channel. Two waveguides make coherent feedback between surrounding MRRs. (d). 2-pole MRR filters. Interferometer-like feedforward coherent interactions. A B and C letters represent different WDM channels affected by the appointed resonator.





Prof. Lukas Chrostowski

Prof. Reuven Gordon

Prof. Peyman Servati

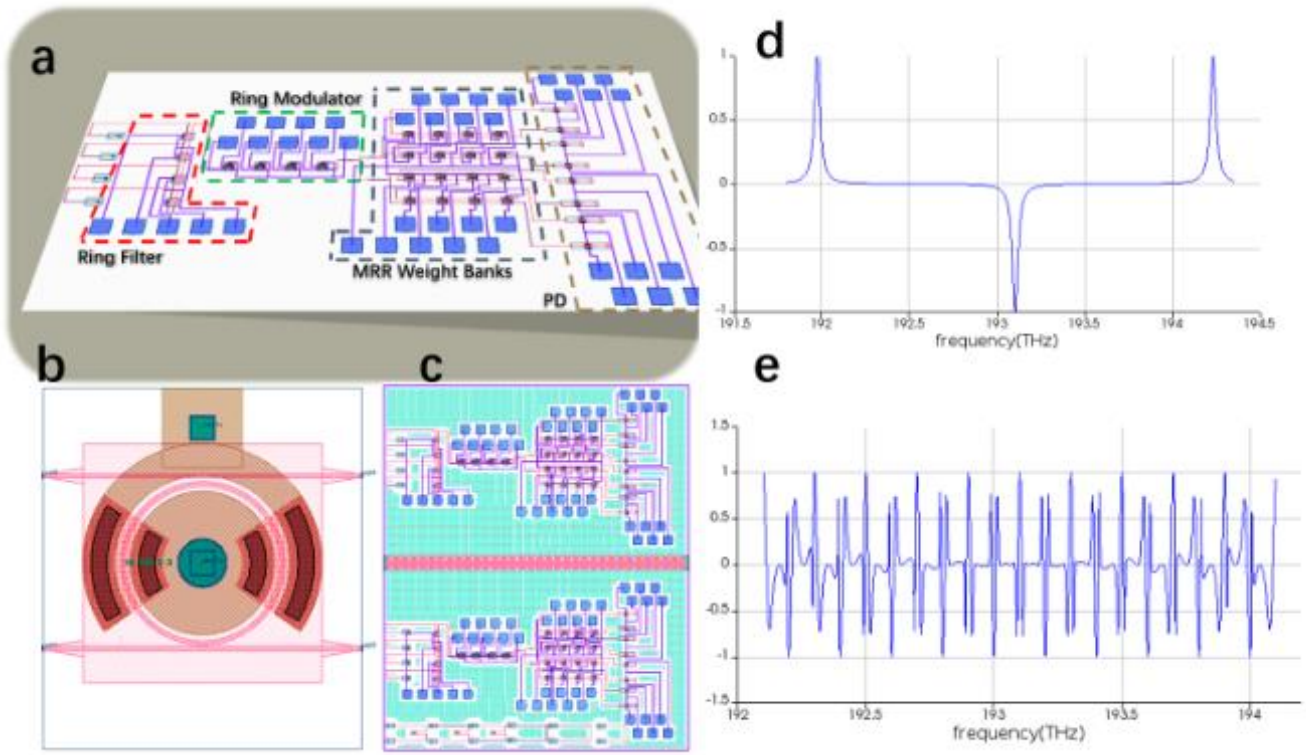
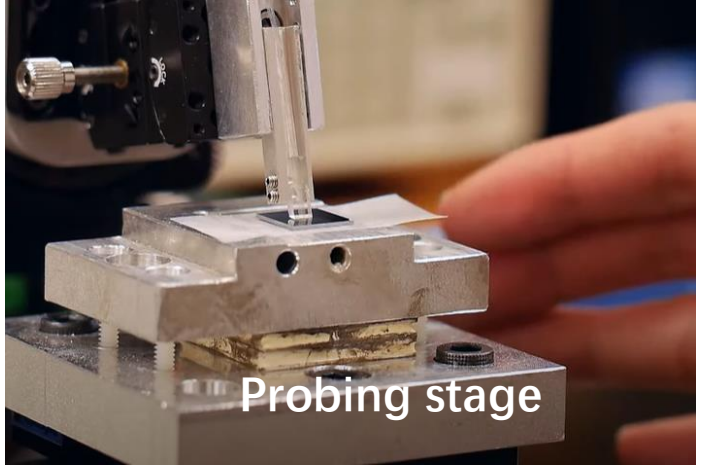
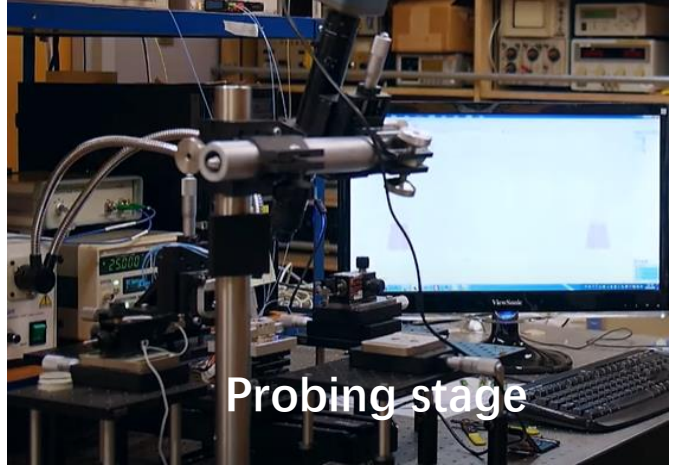
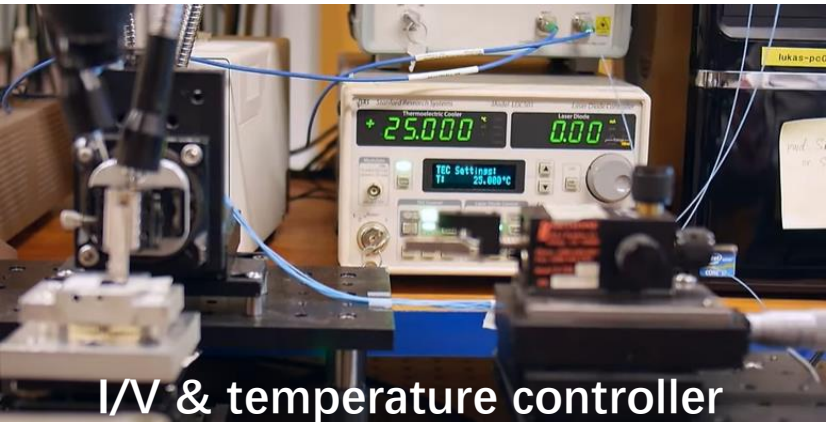


Fig. 3. Details in weight bank design. (a). Overview GDS design of the standard weight bank design based on silicon chip. (b). MRR zoomed-in graph with an N-doped in-ring heater. (c) Overall schematic view of weight bank design after tilling. (d). Interconnect outcome of a demux. (e). Interconnect outcome of 4 series ring resonators

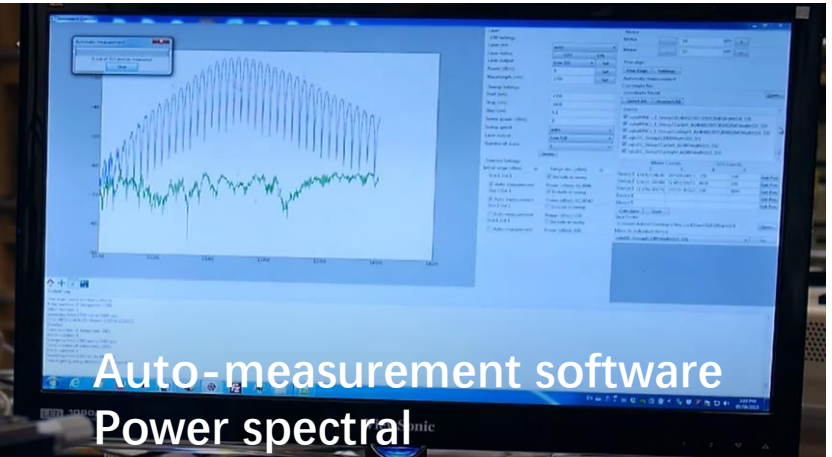

1550 tunable laser

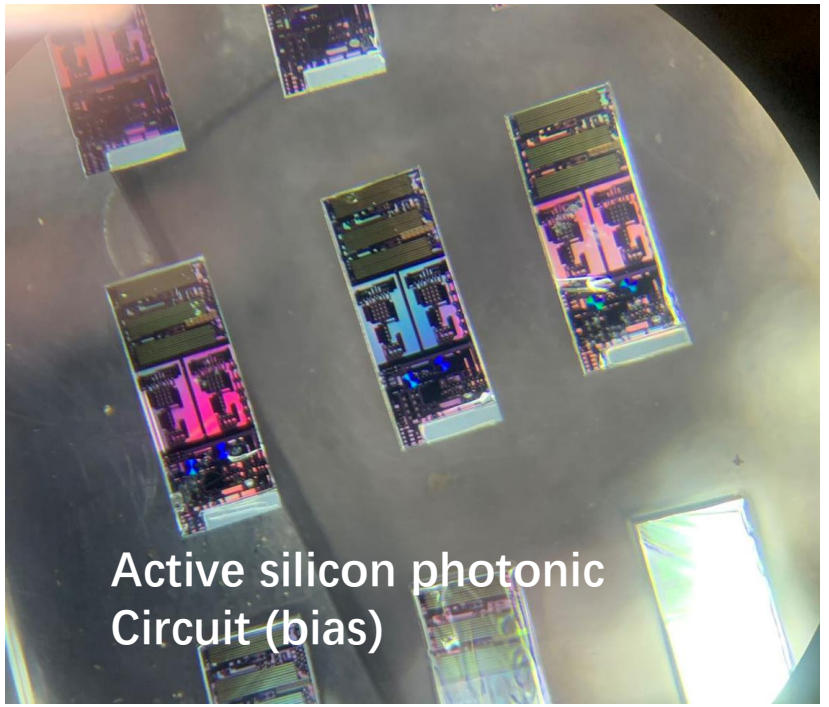

Probing stage

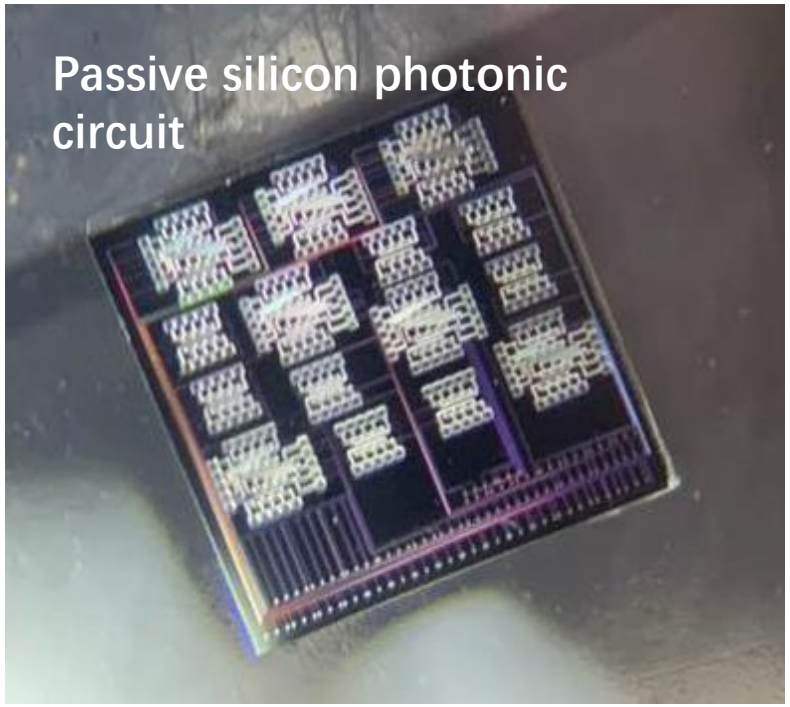

Probing stage



I/V & temperature controller

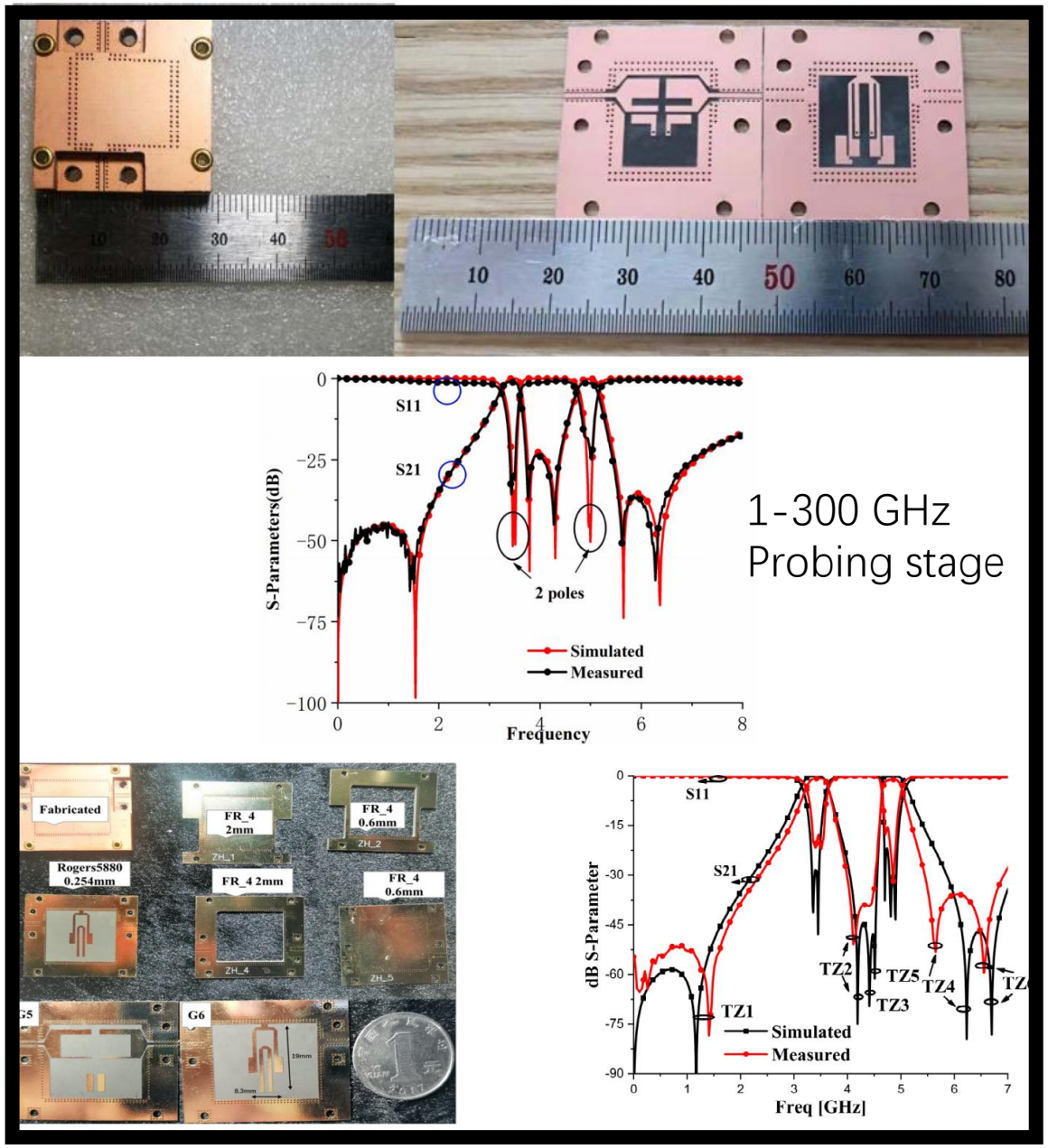

Auto-measurement software
Power spectral


Active silicon photonic
Circuit (bias)


Passive silicon photonic
circuit

09/2018-05/2020 Interconnection Perception Microelectronics Laboratory of Tianjin University
Research Assistant Supervisor: Prof. Kaixue Ma (Dean at the school of Microelectronics)

- Undertaking an Innovative Project for College Students in the Laboratory (**the Excellent USRP in Province, 1%**). The project aimed to design a Self-Packaged dual bandpass filter with multiple transmission zeros for 5G sub-6 GHz applications. I proposed a novel **coupling topology** (**optimized by using machine learning**) for designing a dual-band bandpass filter with multiple and controllable transmission zeros TZs. In this USRP, two types of dual bandpass filters are designed, fabricated, and tested.
- **The project has been published two paper in Wiley and IEEE (SCI JCR Q2), seperatly.**
- Designed a dual-band board-level antenna with machine learning for 5G sub 6 GHz applications.



Perspective | Published: 02 December 2020

Inference in artificial intelligence with deep optics and photonics

Gordon Wetzstein, Aydogan Ozcan, Sylvain Gigan, Shanhui Fan, Dirk Englund, Marin Soljačić, Cornelia Denz, David A. B. Miller & Demetri Psaltis

Nature **588**, 39–47 (2020) | Cite this article

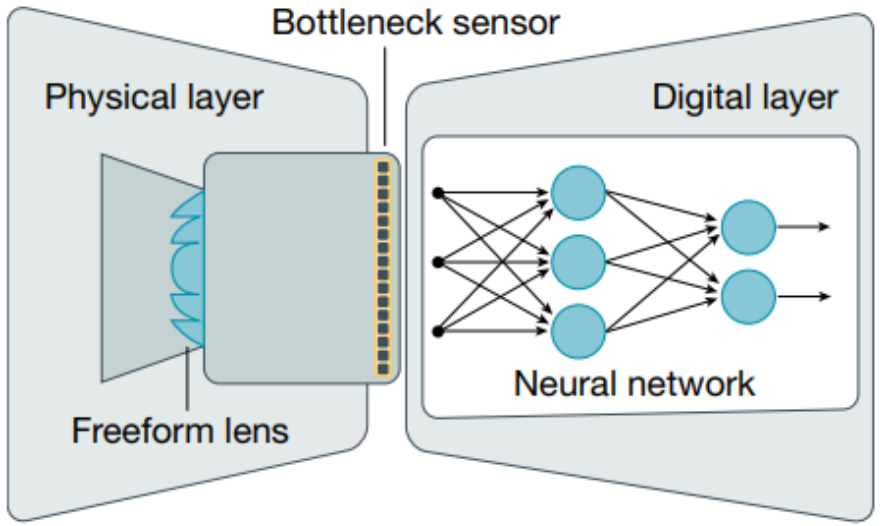
Stanford University

UCLA Samueli Electrical & Computer Engineering

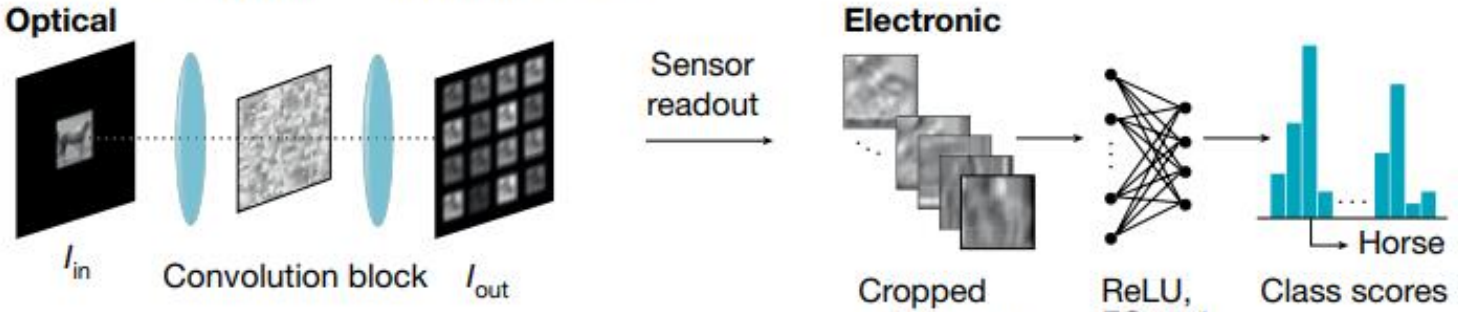
SORBONNE UNIVERSITÉ

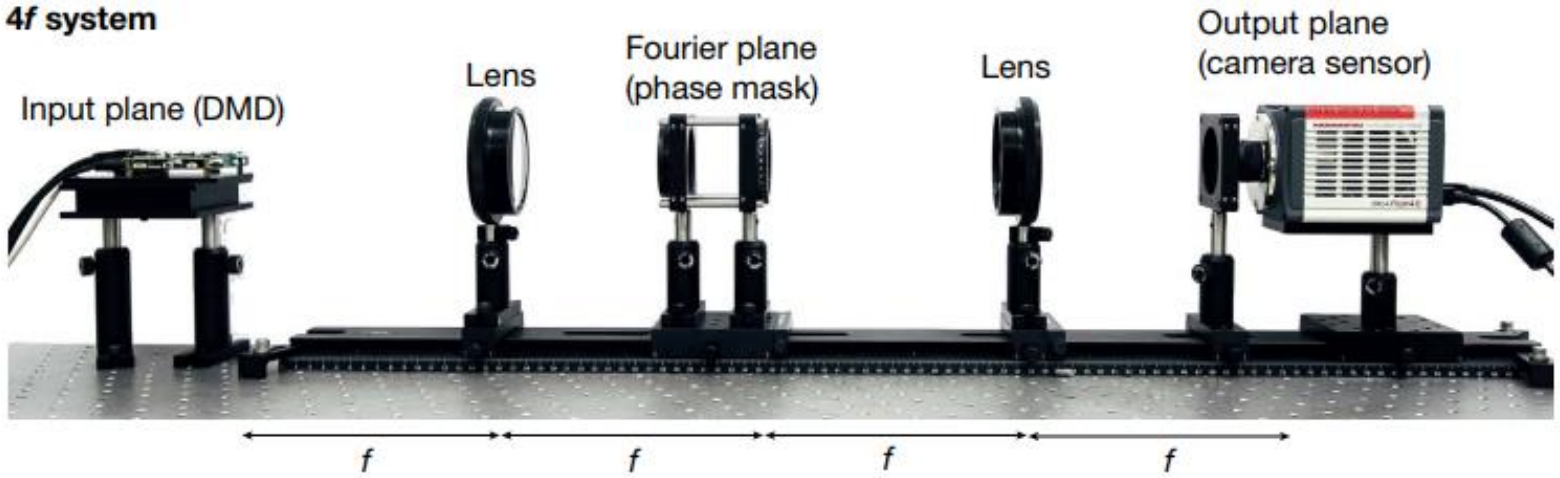
EPFL

Massachusetts Institute of Technology



Schematic of a hybrid optoelectronic CNN





Zemax
PIRATEWARES

Optical devices

Nanophotonics and nano-devices

Ansys

lumerical

High Frequency Structure Simulator
HFSS-Software

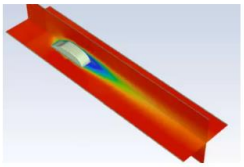
ANSYS HFSS

Blank: Computational optics?

EM Simulation
High-frequency devices

Ansys Enables Faster, More Reliable Chip Design for Juniper Networks

Ansys helps Juniper achieve highly

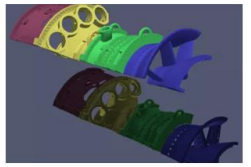


Deep Learning Is Poised to end the Trade-off Between Speed and Fidelity

The Ansys research and

How AI and ML are Changing Simulation

At Ansys, we can speed up simulation by factors of 100X by training neural networks via data-



AI and ML: The Brave New World of Simulation

The capabilities of AI and ML are quietly changing the field of engineering simulation. Read how

James Pond
Distinguished Engineer at Ansys

Adam Reid
Senior Director R&D at Ansys

Stephen Hughes
Professor at Queen's University

Powerful Ecosystem Partners

cadence
SIEMENS
tsmc
python
AIM photonics
Fraunhofer HHI
imec
TOWERJAZZ
The Global Specialty Foundry Leader

Skills

- Operation System: MS Windows, Linux OS, MAC OS
- Software: MS Office, MATLAB, Git, Unity
- Tool Language: Python, Swift, PHP, C/C++/C#, LaTeX (Overleaf)

Community Services:

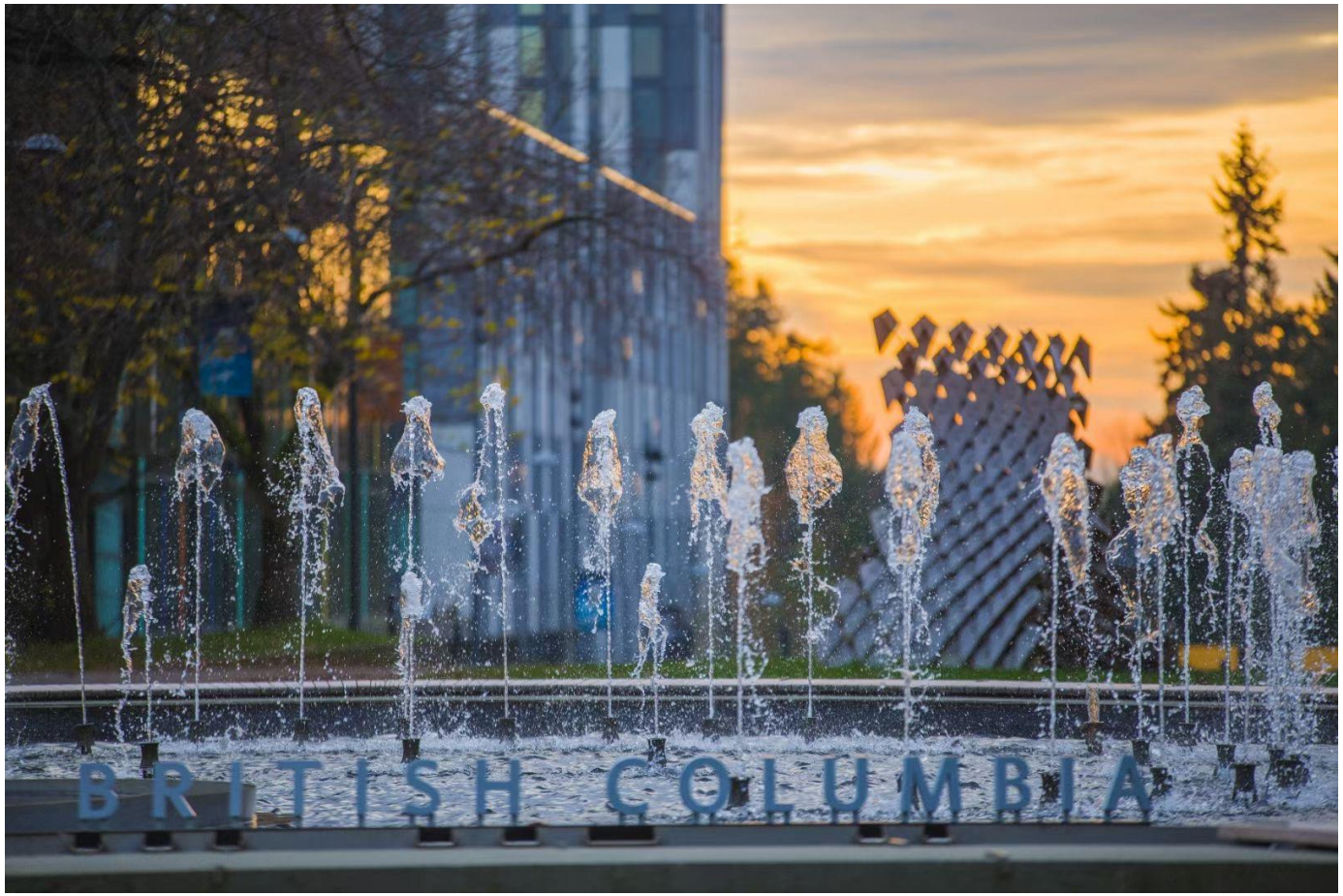
- Student Member in ACM/IEEE/Optica/SPIE/Women in Engineering
- Reviewer in ICCV, IEEE MWCL, Wiley MOTL, OE

Hobbies

Marathon, skiing, photography, hiking, camping, astronomical observation, badminton, basketball.

Github

https://github.com/Zhang-Wenwen



Beautiful Campus of British Columbia & Tianjin University

The Great thankful to my current/past supervisors, collaborators, and references

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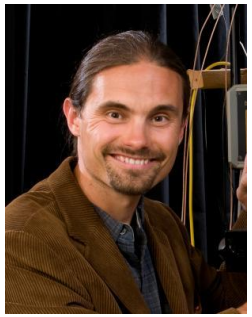
Prof. Reuven Gordon @UVIC + UBC ECE FIEEE/SPIE/OPTICA



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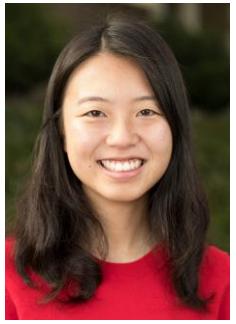

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