

Introduction about myself

Wenwen Zhang

Keywords: Creative, passionate, leadership

Research interests: AI + Optics, machine learning, quantum information
and science

OPTICA

SPIE.

IEEE



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, quantum information and science. 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.

- **09/2020-12/2022 MAS.c Electrical & Computer Engineering, University of British Columbia (UBC)**
 - Research student at flexible electronics and energy lab
 - Research student at Silicon photonic group
- **09/2022-04/2023 Visiting Graduate Researcher, University of California, Berkeley(UCB)**
 - Visiting research student (Friedman Scholar)
- **08/2016-06/2020 B.S.c Electrical & Computer Engineering, Tianjin University (TJU)**
 - Sub area: Electric engineering
 - Overall GPA: 3.9/4.0



Publications and Patents

- **W. Zhang***, H. Zhang, **Probing Ring Resonator Sensor Based on Vernier Effect**. Poster – 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*)
- **W. Zhang***, A. Tashakori, Z. Jiang, A. Servati, C. Kuo, and P. Servati. **A Flexible Sensor System for Lower Body Locomotion Estimation**. *IEEE Transactions on Biomedical Engineering* (*in reviewing*).
- **W. Zhang***, C Kuo and P Servati. **A Wearable Sensor System for Measuring Pathological Gait Parameters**. *IEEE Transactions on Biomedical Engineering* (*in reviewing*).
- **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.
- **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 Wireless Components Letters*, 2020, 30(12): 1121-1124.
- Zhang H, Ma K, **Zhang W**, et al. **A Novel 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)

Conferences and Presentations

- **W. Zhang*, H. Zhang, Probing Ring Resonator Sensor Based on Vernier Effect. Poster/paper – Accepted by 2023 IEEE Silicon Photonics Conference (Washington, US).**
- **W. Zhang*, A. Tashakori, Z. Jiang, A. Servati, C. Kuo, and P. Servati, A Flexible Sensor System for Lower Body Locomotion Estimation. Poster - 2022 Biomedical Engineering Society Annual Meeting. [\(Link\)](#).**
- **W. Zhang*, C. Kuo and P. Servati, A Wearable Sensor System for Measuring Pathological Gait Parameters. Poster - 2022 Biomedical Engineering Society Annual Meeting. [\(Link\)](#).**

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WENWEN ZHANG



[!\[\]\(9aae4ef11f04080694e1bcd3250dc654_img.jpg\) tweet](#) [!\[\]\(1f875e8ff0db454eb302861a56ff194f_img.jpg\) share](#) [!\[\]\(05604d380e755a92e3161ab249a7c58e_img.jpg\) share](#) [!\[\]\(e63e8c500251dacf23596c452b949a7b_img.jpg\) forward](#)

WHY DID YOU DECIDE TO PURSUE A GRADUATE DEGREE?

I'd like to contribute my humble efforts to make any progress that is meaningful and beneficial to the human health. Engineering is a creative and amazing field where everything is possible. I hope to devote myself on the intersecting areas of biomedical/biology and state-of-art technology (machine learning) to develop more innovative applications and be prepared to all the challenges in this rapidly changing world full of opportunity.

WHY DID YOU DECIDE TO STUDY AT UBC?

UBC is a world-class university, providing me the opportunity to get access to the top-level platform, more diversified learning experience and more excellent scholars. Being able to cooperate with the innovative professors and students here, I can have a better insight into my doctoral academic direction and get more inspiration on the future research topic.

WHAT IS IT SPECIFICALLY, THAT YOUR PROGRAM OFFERS, THAT ATTRACTED YOU?

The Department of Electrical and Computer Engineering at UBC is a diversified place where we are able to get touched with different kinds of excellent people. We can explore varied fields from circuit fabrication to model design. This precious experience can help us find out where exactly our academic research interest lays as well as give us guidance on future directions.

WHAT WAS THE BEST SURPRISE ABOUT UBC OR LIFE IN VANCOUVER?

Living with all the wildlife from racoon to coyotes, from geese to deer makes me so excited. Learning how to appreciate them while not disturbing their life is extremely important and meaningful. Also being within a campus where you can find cultures from all over the world also teaches me that showing respectful to others makes everyone's life better.

“

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

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

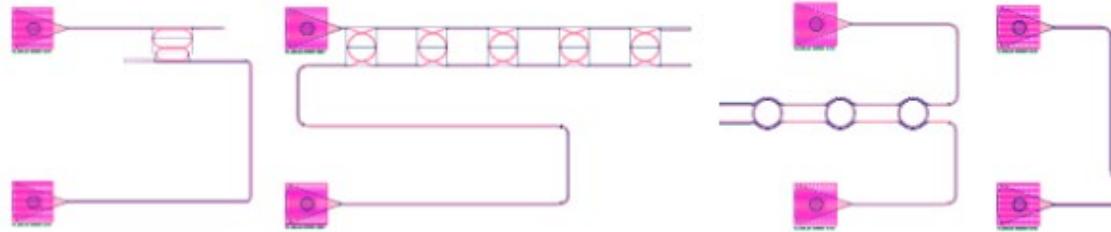
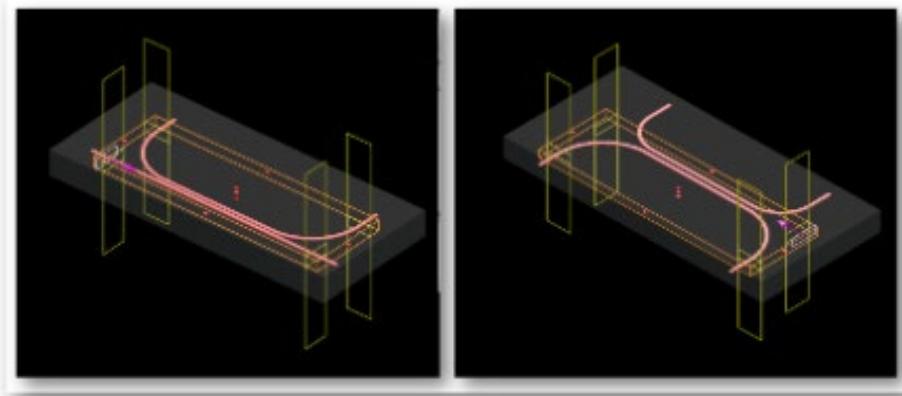


Electronic and Computer Engineering Department, UBC
Instructor: Prof. Lukas Chrostowski

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.
- Designing parallel and cascaded ring resonators exhibiting Vernier effect and extended free spectral range (FSR).

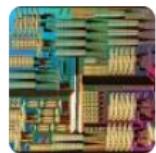




<https://github.com/SiEPIC> 翻译此页

SiEPIC - GitHub

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

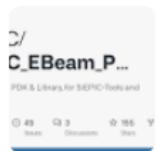


https://github.com/SiEPIC/SiEPIC_EBeam... 翻译此页

SiEPIC/SiEPIC_EBeam_PDK - GitHub

The SiEPIC-Tools package includes:

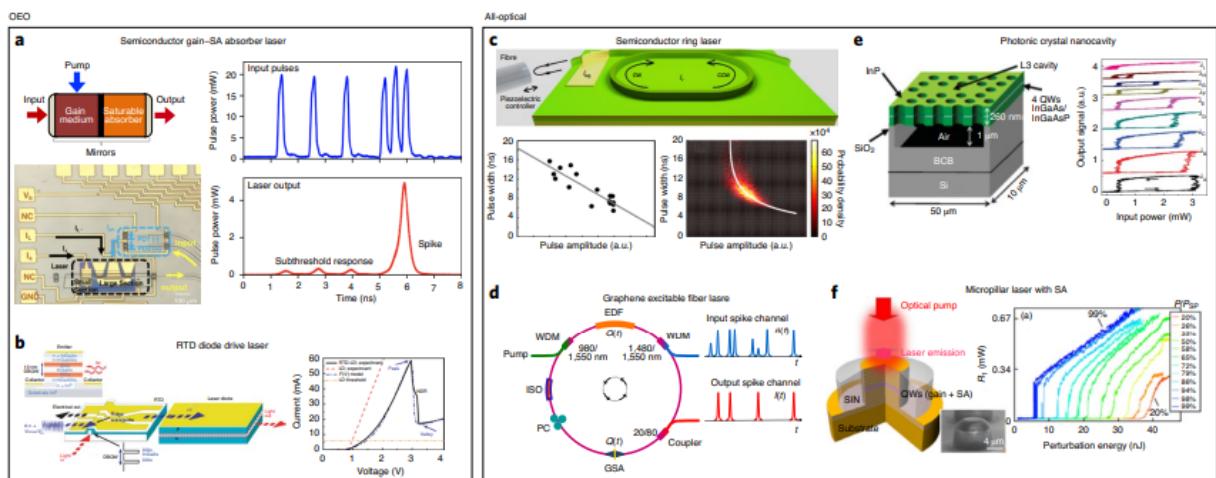
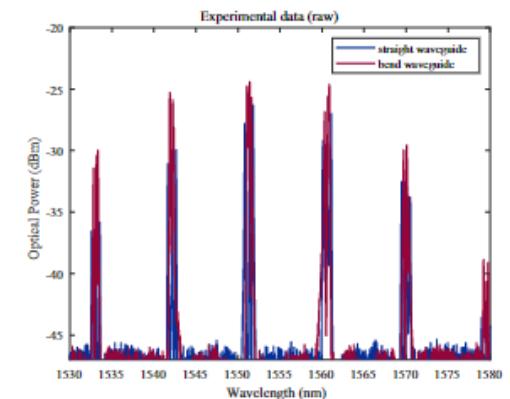
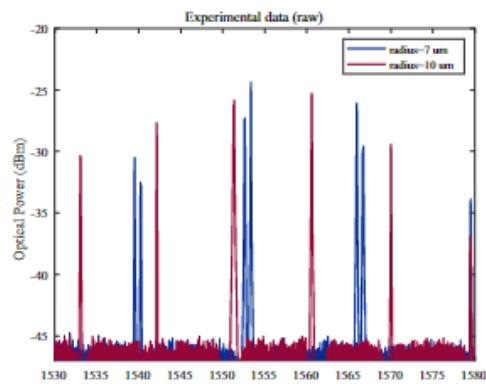
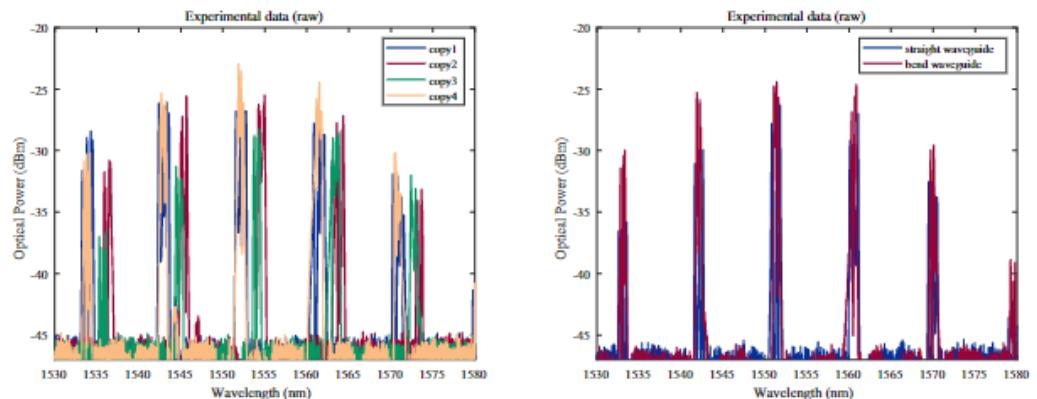
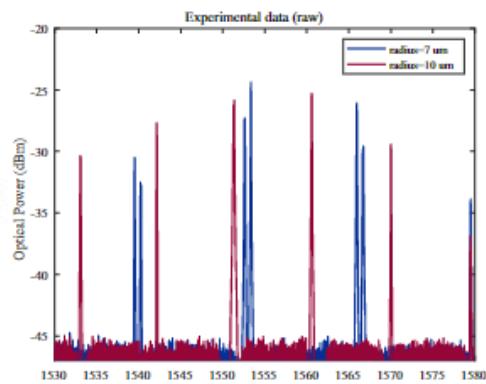
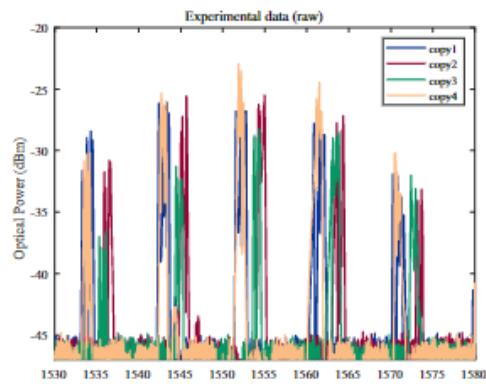
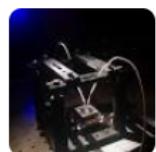
- Netlist generation
- Creating a Spice netlist suitable for circuit simulations.
- Menu item "Lumerical INTERCONNECT" will ...



<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 ...



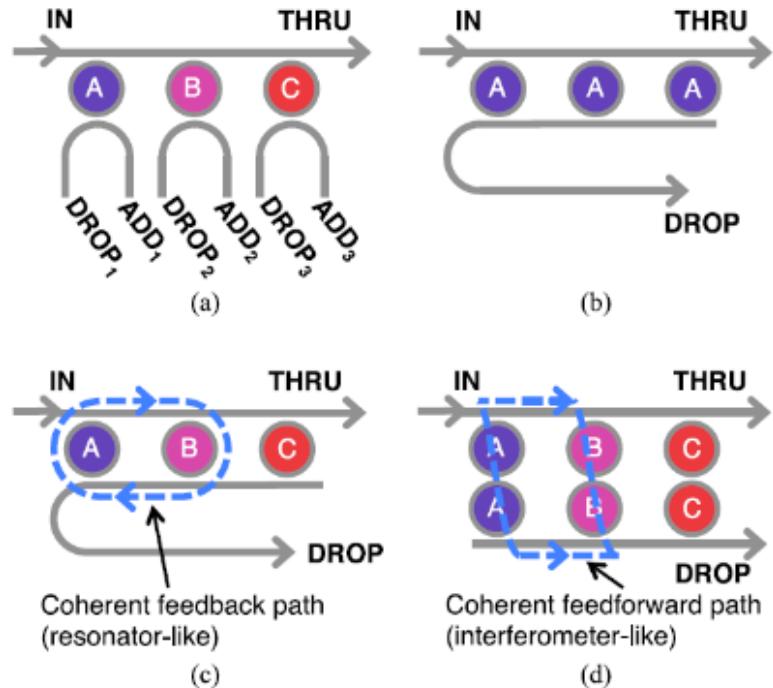


Fig. 1. Different types of weight bank [24]. (a). Add-drop multiplexer. (b). Dual-band double channel side-coupled integrated spaced sequence of resonators (SCISSLORs). (c). 1-pole MRR filters. Each MRR controls a separate WDM channel. Two waveguides make coherent feedback between surrounding MRRs. (d).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

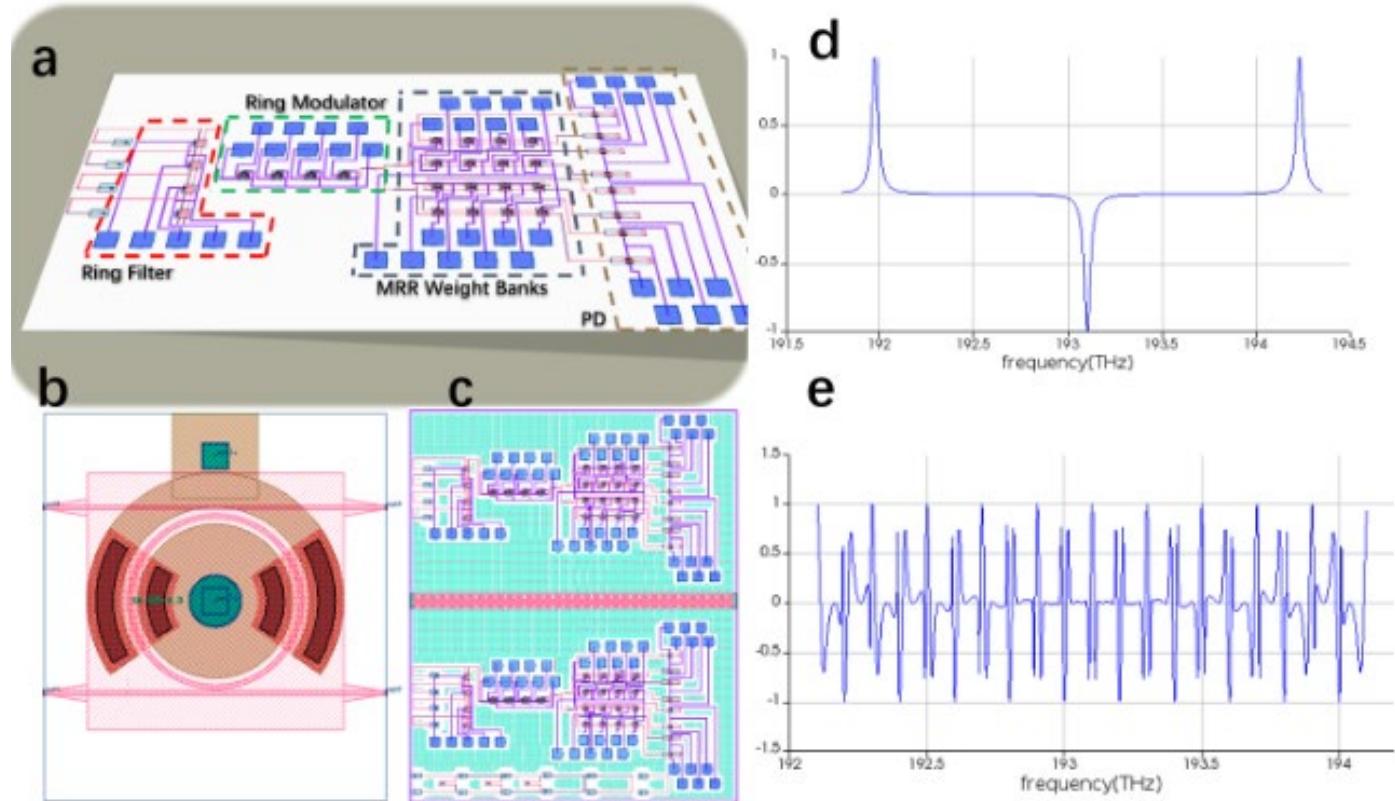
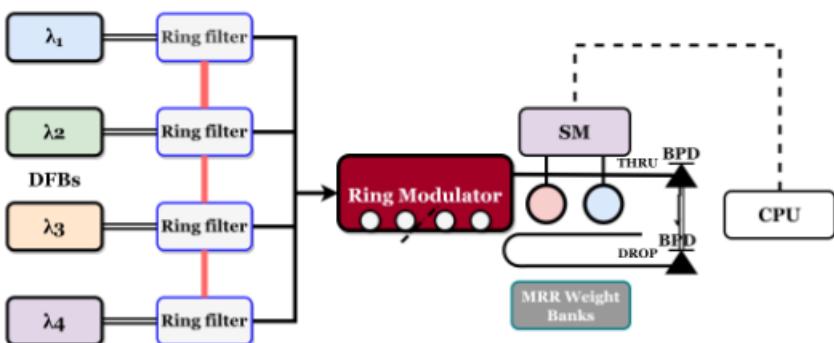
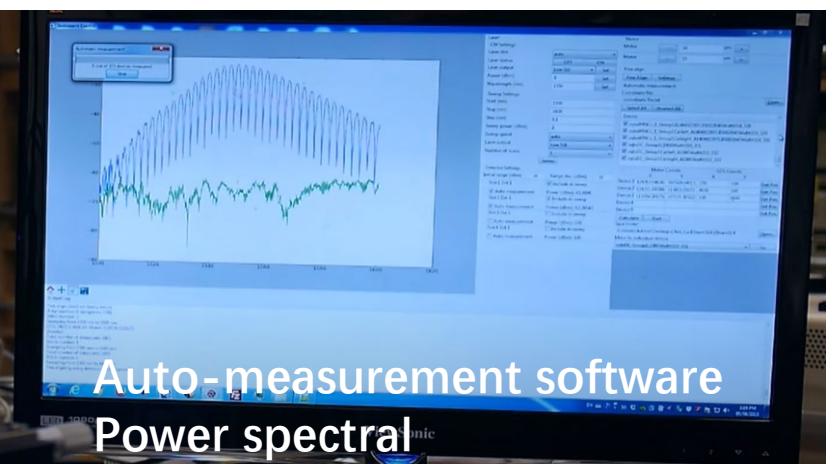
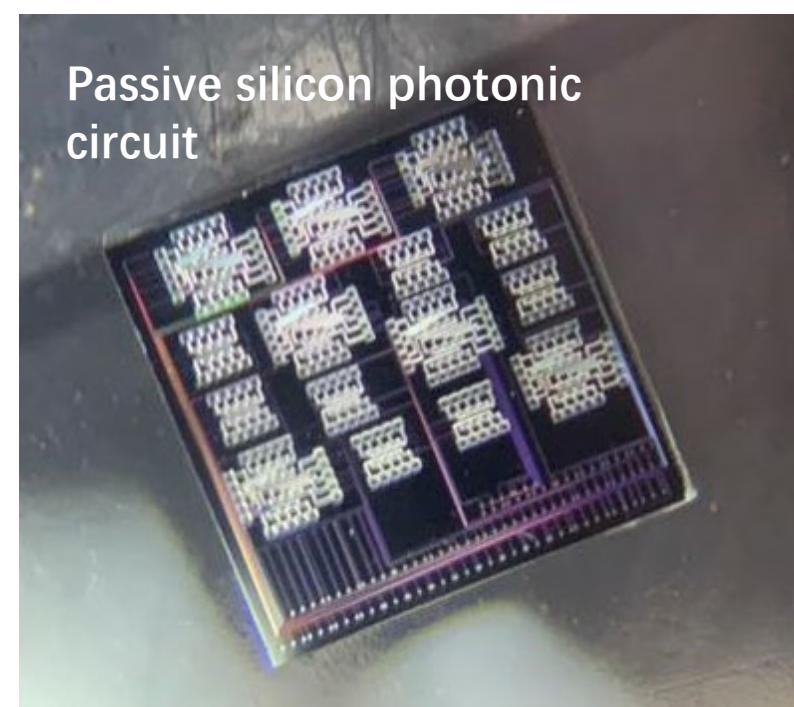
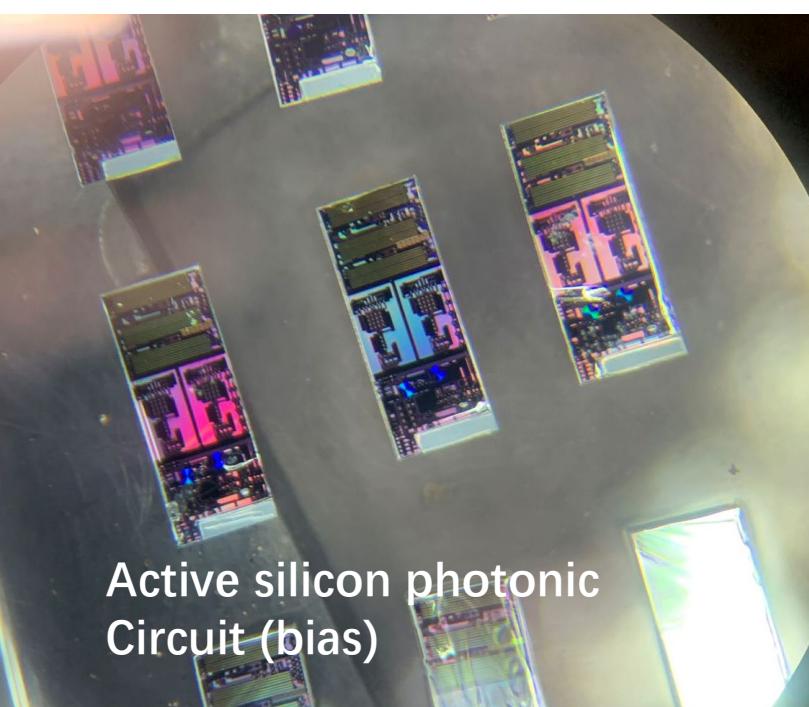
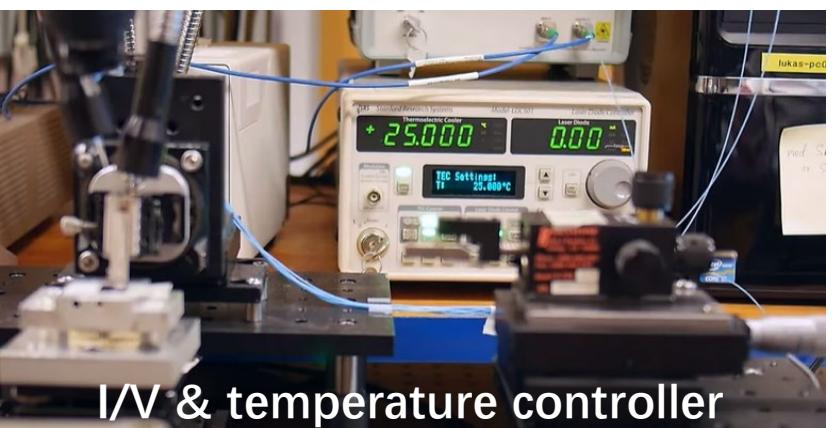
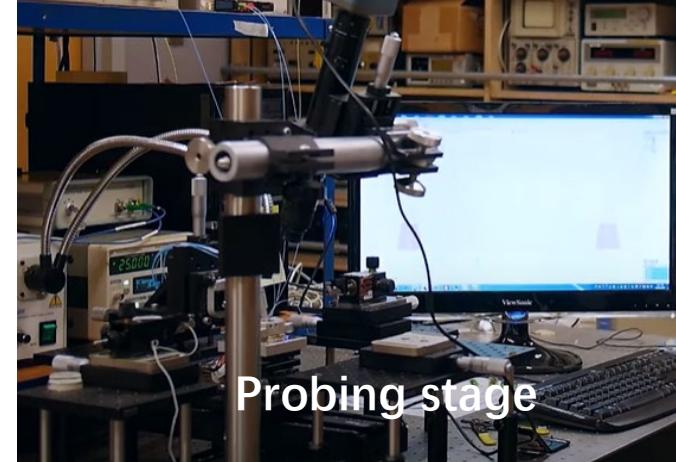
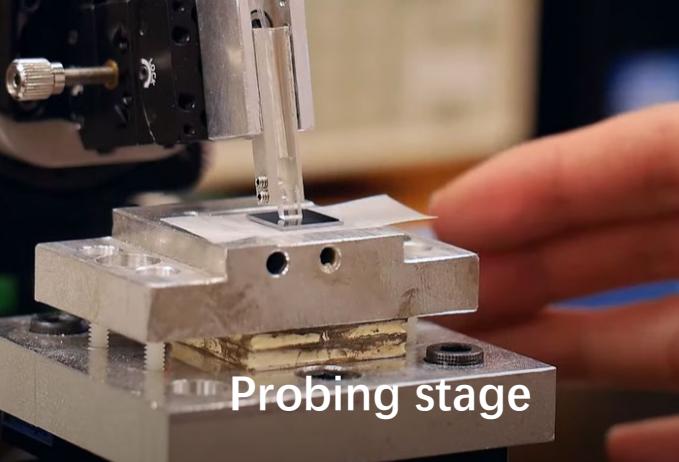


Fig. 3. Details in weight bank design. (a). Overview GDS design of the standard weight bank design based on silicon chip. (b). MRR zoomed-in graph with an N-doped in-ring heater. (c) Overall schematic view of weight bank design after tiling. (d). Interconnect outcome of a demux. (e). Interconnect outcome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



[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)

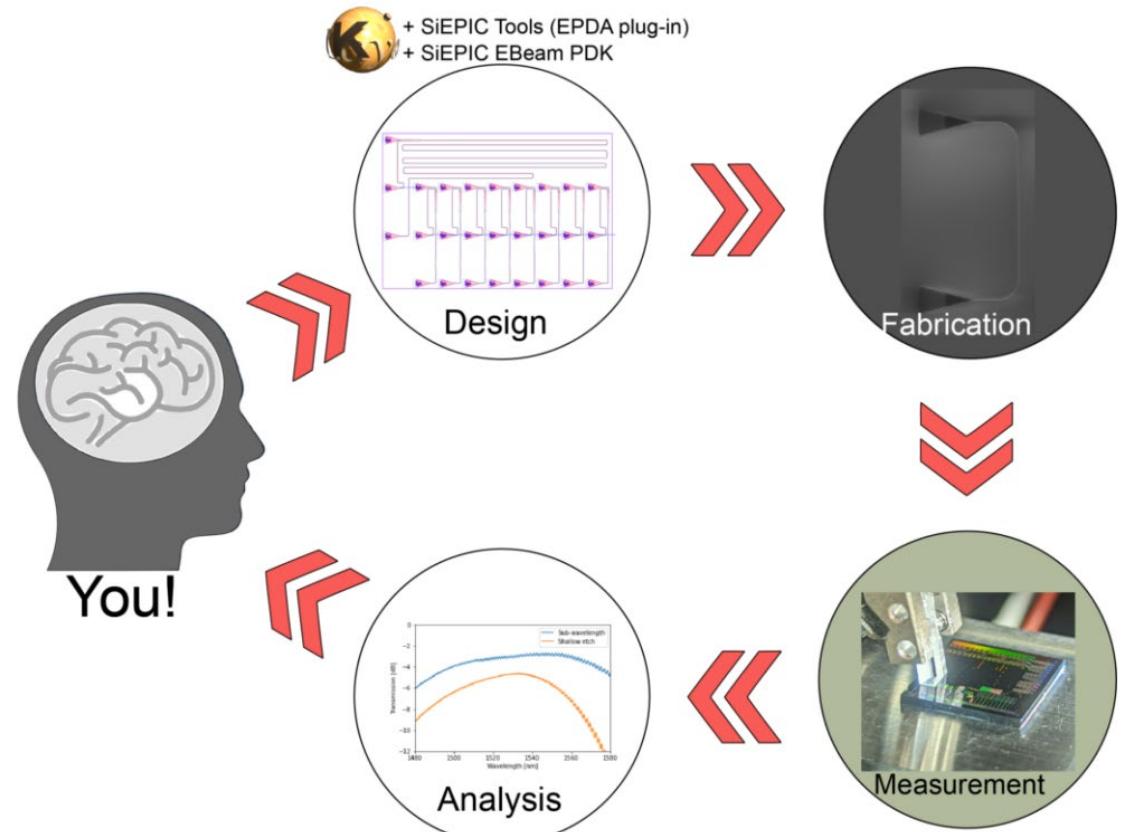
● Python ⭐ 111 🏷 77 ⚡ 69 (3 issues need help) ⏱ 6 Updated 2 weeks ago

[SiEPICfab_Shuksan_PDK](#) Public

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

● Python ⭐ 2 🏷 5 ⚡ 0 ⏱ 0 Updated 3 weeks ago

 + SiEPIC Tools (EPDA plug-in)
+ SiEPIC EBeam PDK



**For ultrafast optics with automatic workflow?
Computational Ultrafast optics? ML based
simulation and implementation? Currently
there's only few groups are working on this.**

- **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).
- Teaching Assistant for CPEN 211 Advanced Embedded Computing Systems (instructor: Prof. Tor Aamodt)
- Teaching Assistant for ELEC 315 Electronic Materials and Photonic Devices (instructor: Prof. Peyman Servati)
- Course highlights:** Introduction to Quantum Computing | Active silicon photonic devices | Passive silicon photonic devices | Signal processing and systems | Nanofabrication | Microwave engineering | Fields and waves of electromagnetic

Working Experience

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

- **Smart Knee Sleeves Based on Flexible Sensors**
06/2022

12/2021-



Lower extremity estimation & movement tracking & muscle condition monitoring by data from flexible sensors (stress, temperature, ect.) integrated on knee braces.

- **Intelligent Glove with Embedded Wearable Sensors.**

12/2021-03/2022

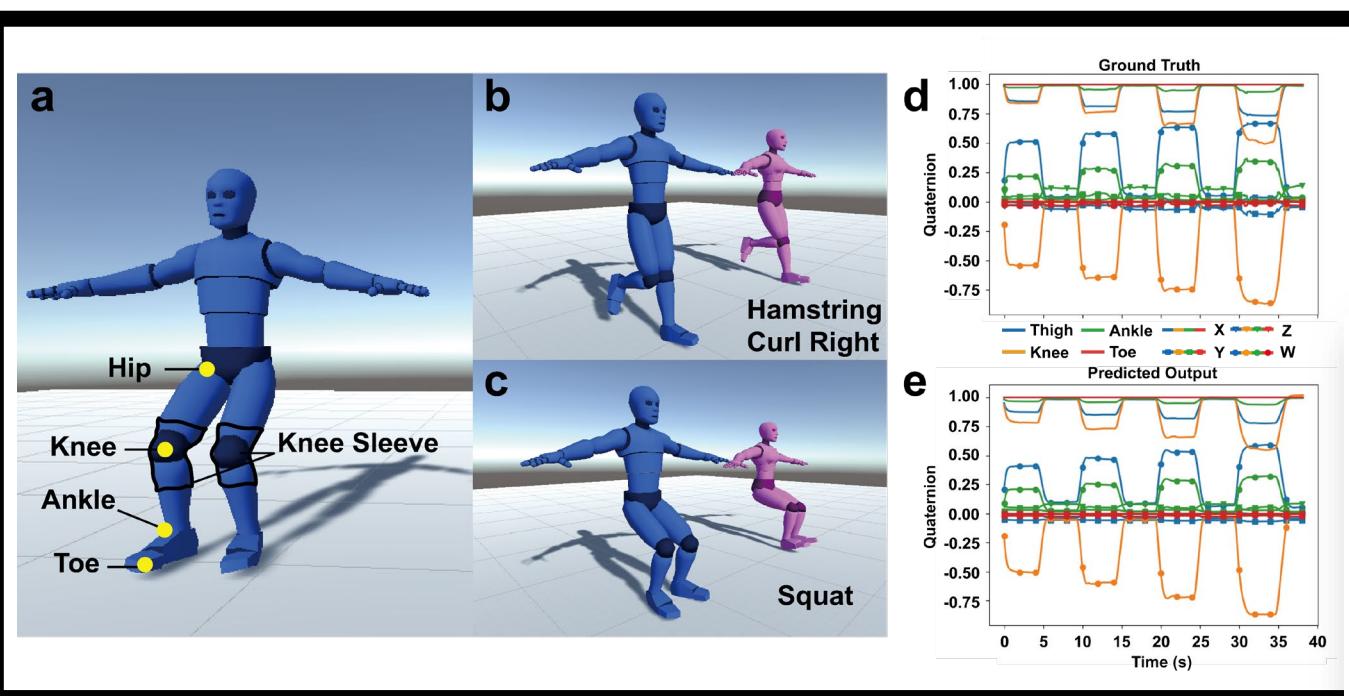
Hand gesture reconstruction of post-stroke patients to assess upper extremity function and help motivate recovery progress.



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 angle estimation.

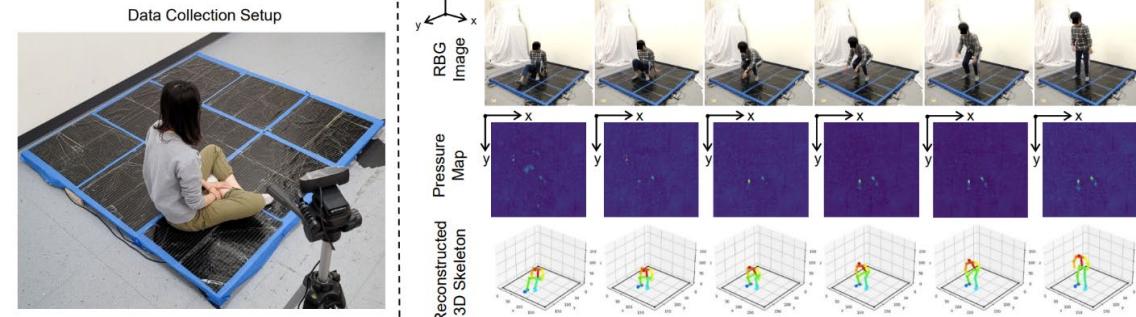


ST TCH



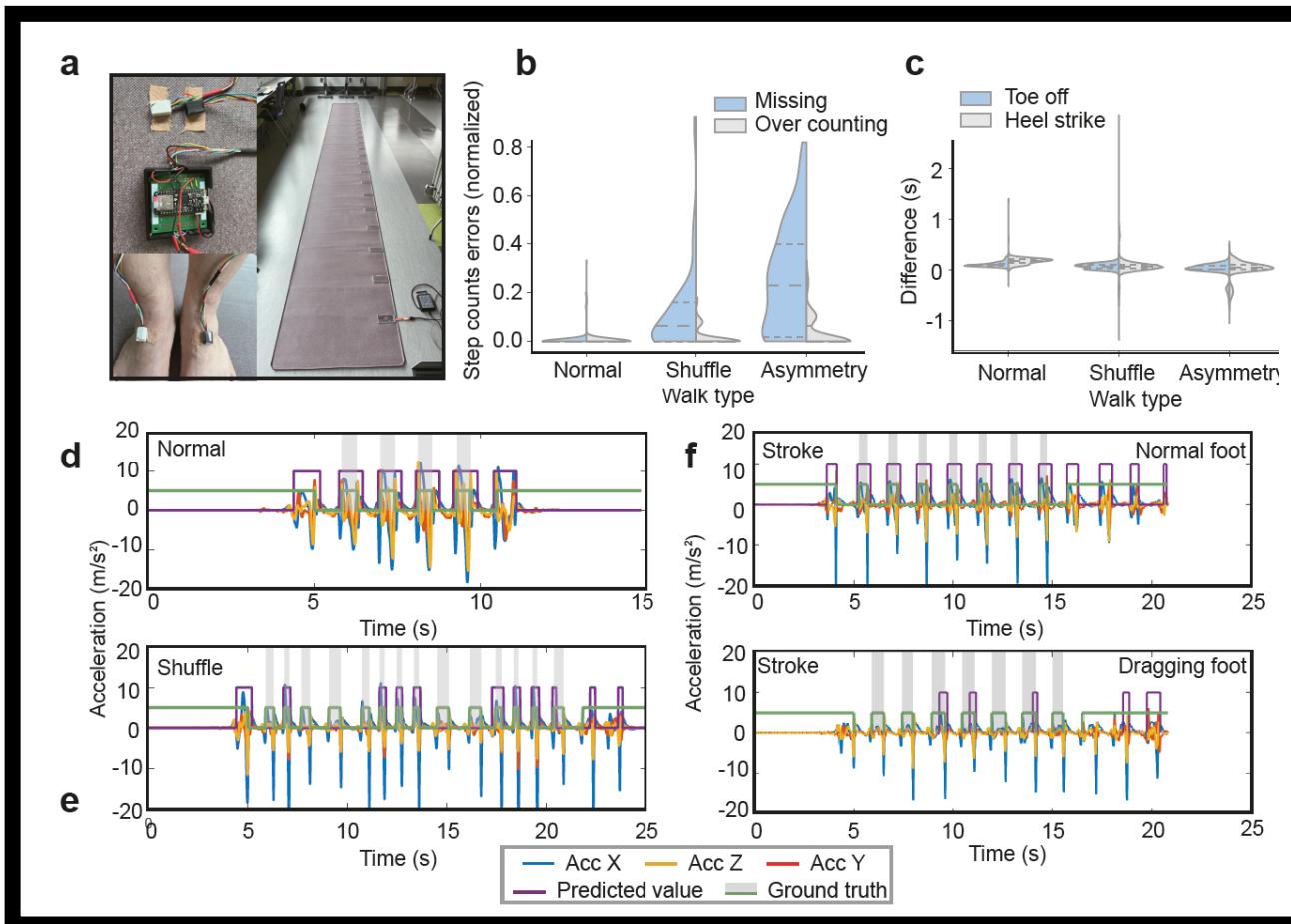
IntelligentCarpet: Inferring 3D Human Pose from Tactile Signals

[Yiyue Luo](#) [Yunzhu Li](#) [Michael Foshey](#) [Wan Shou](#) [Pratyusha Sharma](#)
[Tomas Palacios](#) [Antonio Torralba](#) [Wojciech Matusik](#)



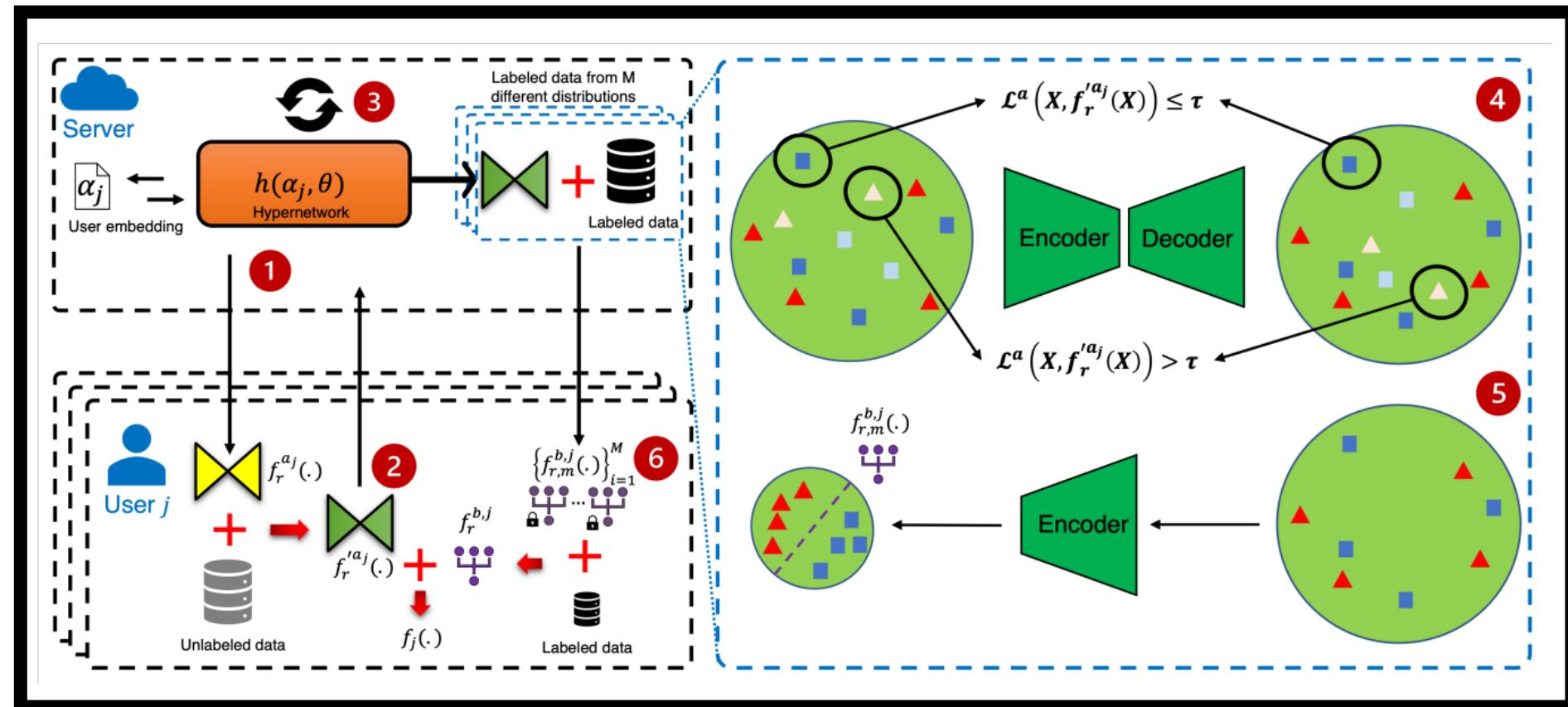
A Wearable Sensor System for Measuring Pathological Gait Parameters.

- 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.



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 heterogenous. 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.



09/2018-05/2020

Interconnection Perception

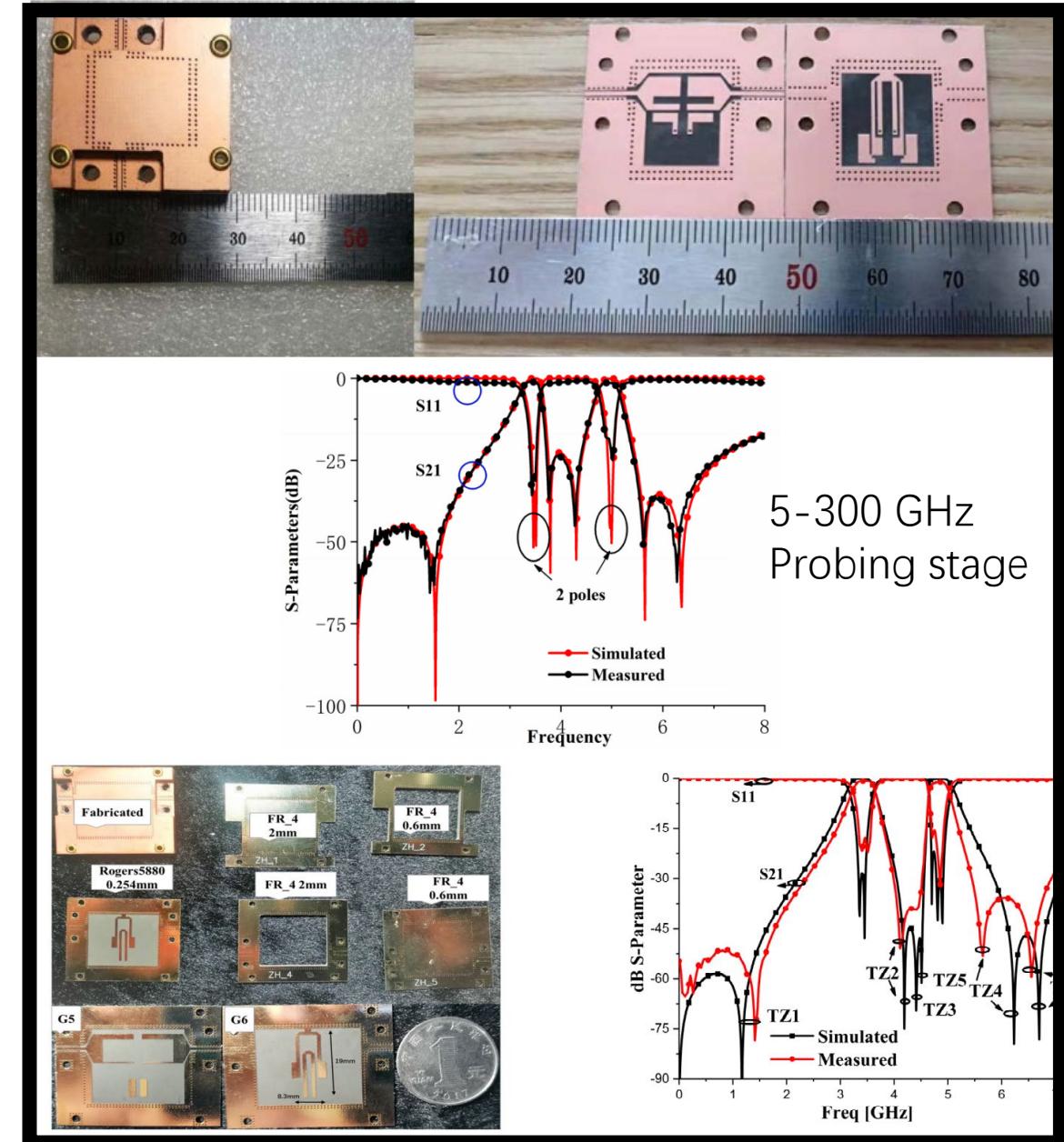
Microelectronics Laboratory of Tianjin University

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).
- 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](#)

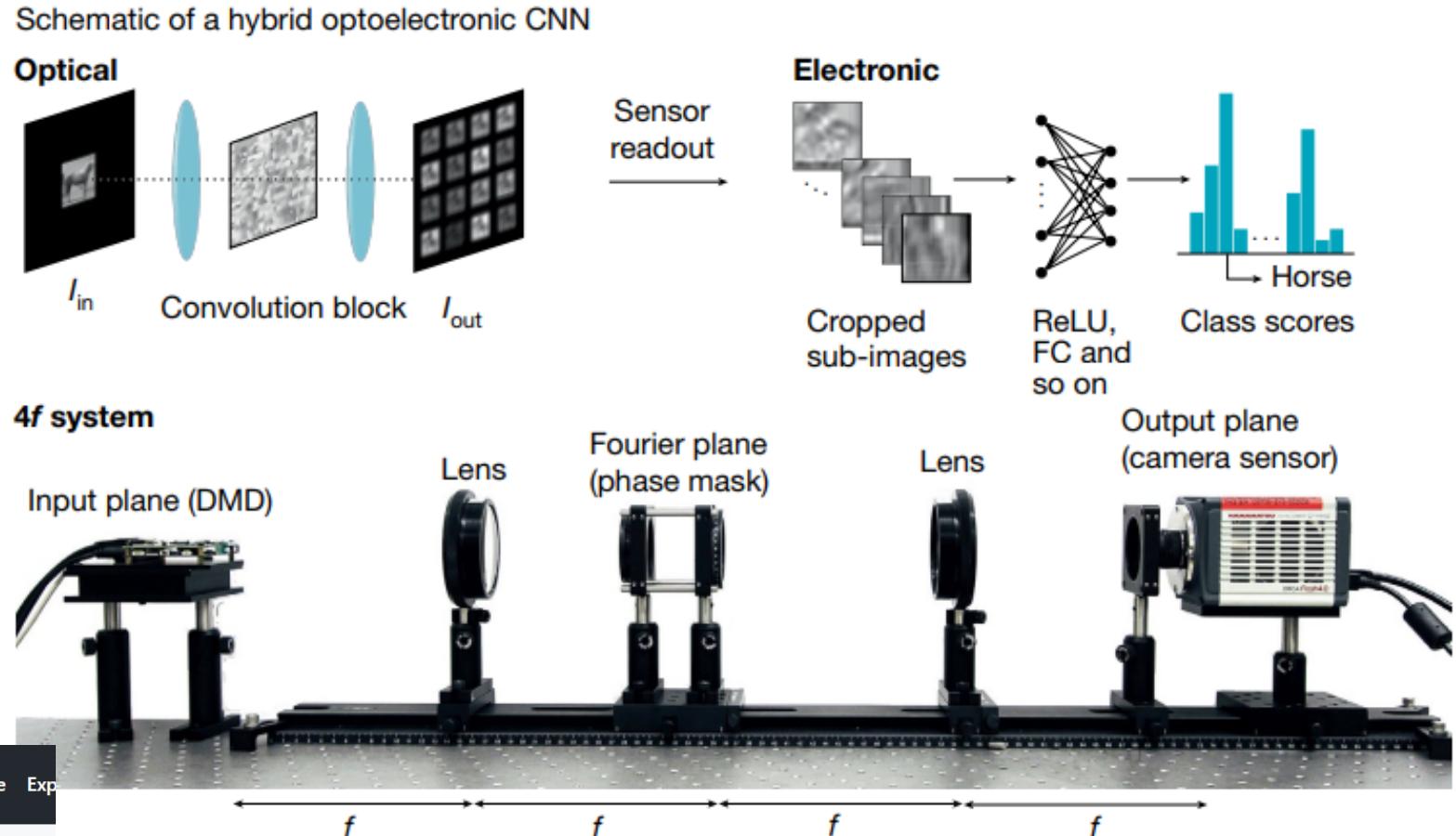
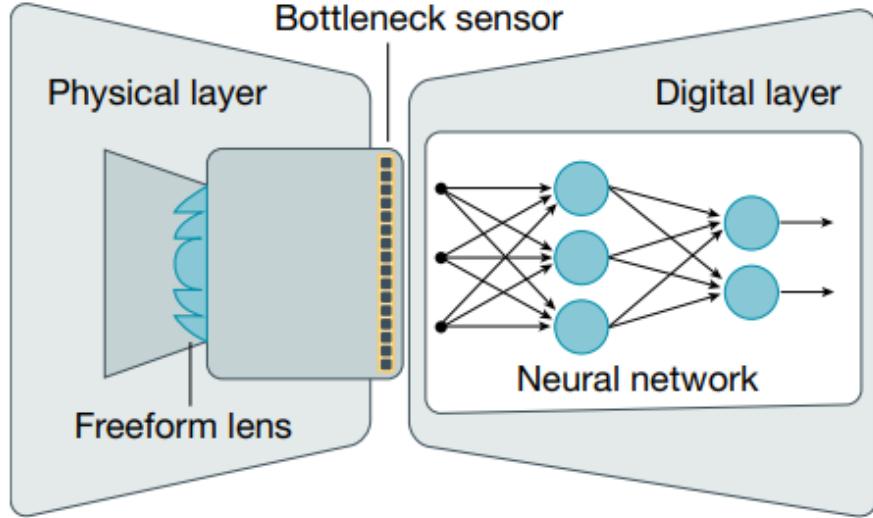
28k Accesses | **216** Citations | **134** Altmetric | [Metrics](#)



Samueli
Electrical & Computer Engineering



**Massachusetts
Institute of
Technology**



LupoLab

The Laboratory of Ultrafast Physics and Optics

3 followers

Edinburgh, UK

<https://lupo-lab.com/>

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[Luna.jl](#) Public

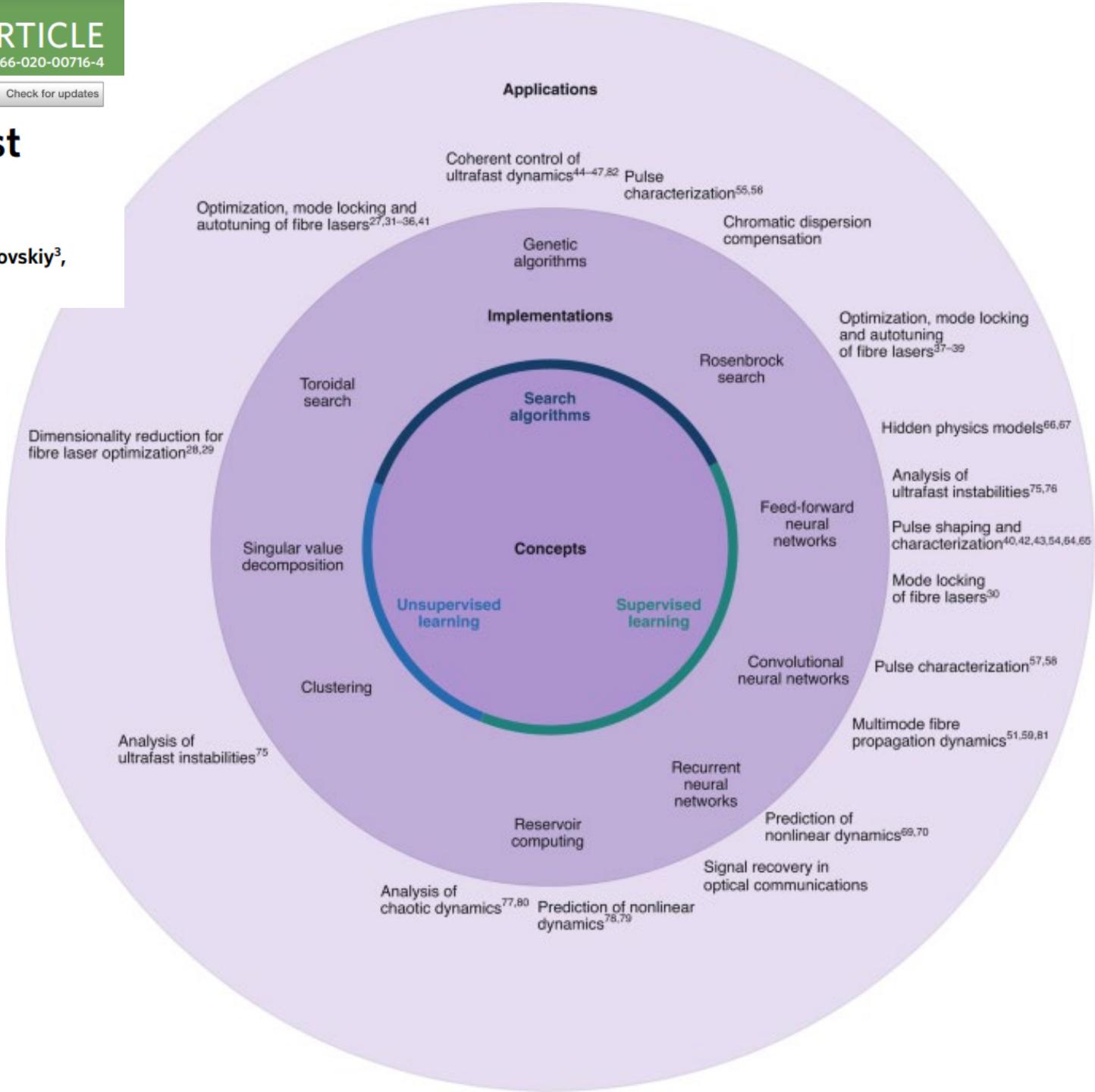
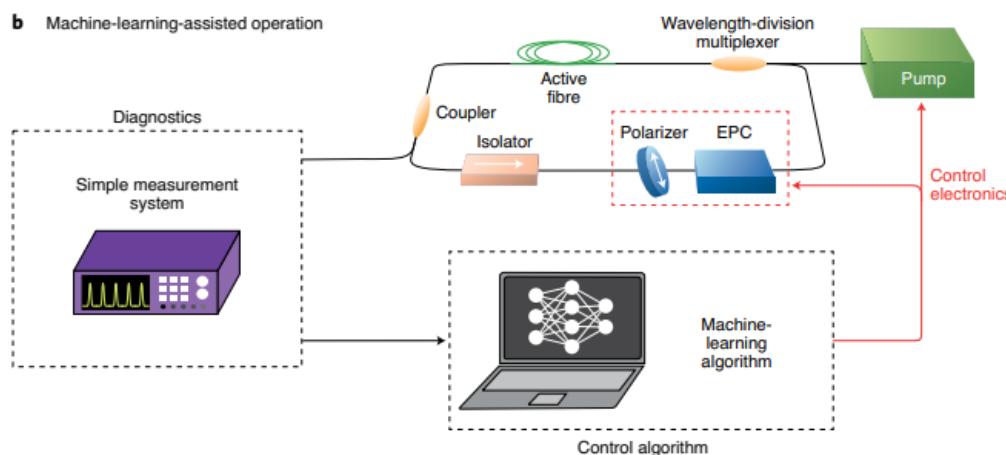
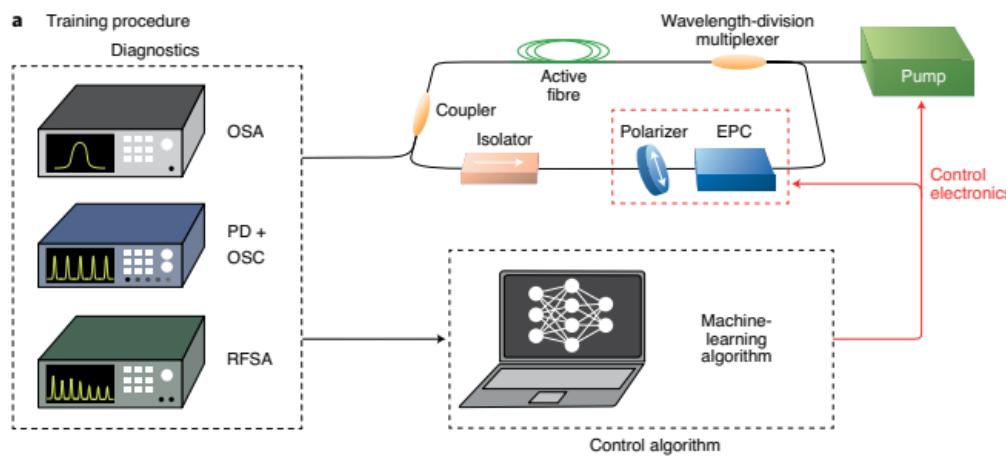
Nonlinear optical pulse propagator

Julia 27 11



Machine learning and applications in ultrafast photonics

Goëry Genty^a✉, Lauri Salmela^b, John M. Dudley^b, Daniel Brunner^b, Alexey Kokhanovskiy^c, Sergei Koltsev^c and Sergei K. Turitsyn^d^e





Optical devices



Nanophotonics and nano-devices

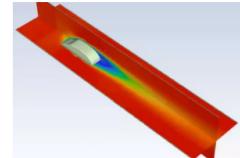


Blank: Ultrafast optics?

EM Simulation
High frequency devices



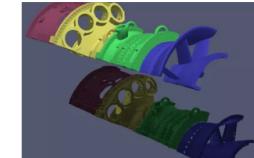
Ansys Enables Faster,
More Reliable Chip
Design for Juniper
Networks
Ansys helps Juniper achieve highly



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*



cadence®

SIEMENS



python™



Awards

- UBC Faculty of Applied Science Excellent Graduate Award
- UBC Friedman Award for Scholars in Health
- UBC International Tuition Award
- UBC Research Assistance Graduate Award
- China College Students Integrated Circuit Competition (the north region), (Top 1 of 140)
- China College Students Integrated Circuit Competition (Final), Second Prize (1%)
- USRP Excellent Project Award of Province (Top 1% in Engineering department)
- First Prize in China Mathematical Contest in Modeling (5% - Tianjin area).
- “Merit Student” Scholarship of Tianjin University
- Career Certification of HCNA Huawei
- “Mathematical Contest in Modeling Certificate of Achievement (MCM)”, Honorable Mention

Certificates and Workshops

- 2021 SIEPIC Active Silicon and Laser Photonics
- 2020 SIEPIC Passive Silicon and Laser Photonics
- The SmarT Innovations for Technology Connected Health (STITCH)
- QSciTech-QuantumBC Virtual Workshop: Gate-based Quantum Computing Using IBM-Q
- 2019/2020 International Workshop on Microwave and Microsystems

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)

Hobbies

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

Github

<https://github.com/Zhang-Wenwen>

