

ISEE 3MT (システム情報 3MT)

“3MT” means Three Minute Thesis. Ph.D. course students will present their research in three minutes. Today, ten students will come. This is a competition. Please vote for the most impressive presenter. The 1st to 3rd outstanding presenters will receive the awards. Please google “ISEE 3MT” and find the voting site in the HP of ISEE 3MT.



“3MT”とは、Three Minute Thesisを意味します。博士課程の学生が自身の研究を3分間でプレゼンテーションします。本日は10名の学生が登壇します。発表後に投票を行いますので、皆さん、審査をお願いいたします。詳細は「ISEE 3MT」で検索するとHPに投票サイトへのリンクがあります。1位から3位には賞品が贈呈されます。



<https://www.isee.kyushu-u.ac.jp/3mt.html>

Voting



Link from <https://www.isee.kyushu-u.ac.jp/3mt.html>
or direct access to <https://forms.gle/xZjRDvQ7XHcpKrwS7>

1 voting/person
1人1投票

Google account
is required
要Googleアカウント

Vote for ISEE 3MT / システム情報 3MT 投票

Please vote here. 投票はこちら。

Please choose the impressive presenter. Please vote for 1st to 3rd place. 1位から3位まで投票してください。

	1st 1位	2nd 2位	3rd 3位
Liu Rui	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cheng Tsz Chung	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amirah Zahrin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diyanatul Husna	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lin Zhang	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
JINYU XU	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HAN YUZHOU	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fan Wenxuan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eilaf Mohamed Abaker BABAI	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kaito Shiku	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

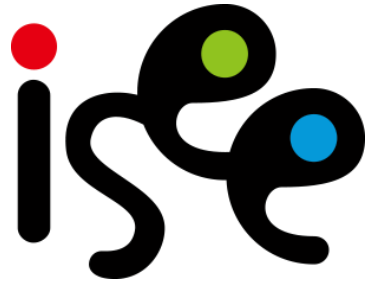
送信

フォームをクリア

このコンテンツは Google が作成または承認したものではありません。 - フォームのオーナーに問い合わせる - 利用規約 - プライバシーポリシー

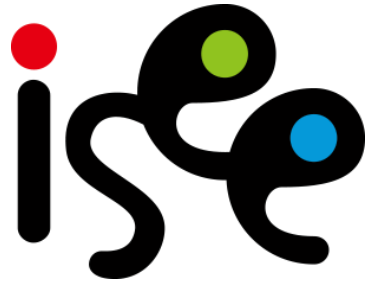
このフォームが不審だと思われる場合 報告

Google フォーム



ISEE 3MT Program

Start	End	Title	by	Lab
9:30	9:40	Opening	Prof. Makoto Yokoo, Dean	
9:40	9:44	Enhancing IDS Visibility through MTD-Induced Behavioral Exposure	Liu Rui	IST Koide Lab
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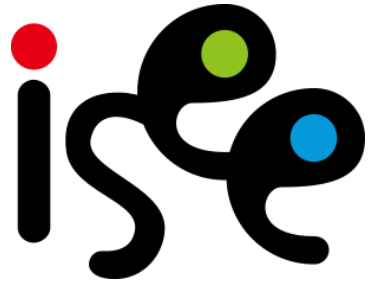
ISEE 3MT

Opening

from

Prof. Makoto Yokoo

Dean of ISEE



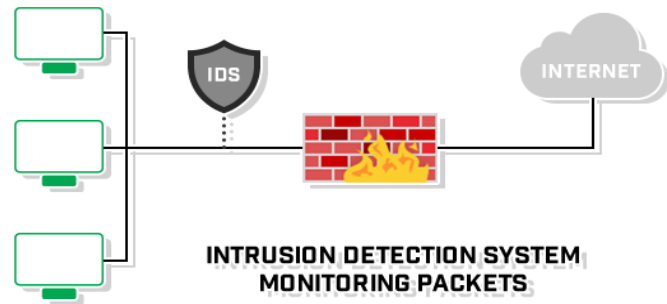
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Enhancing IDS Visibility through MTD-Induced Behavioral Exposure

I. Research Background

IDS (Intrusion Detection System) monitors network traffic to detect attacks

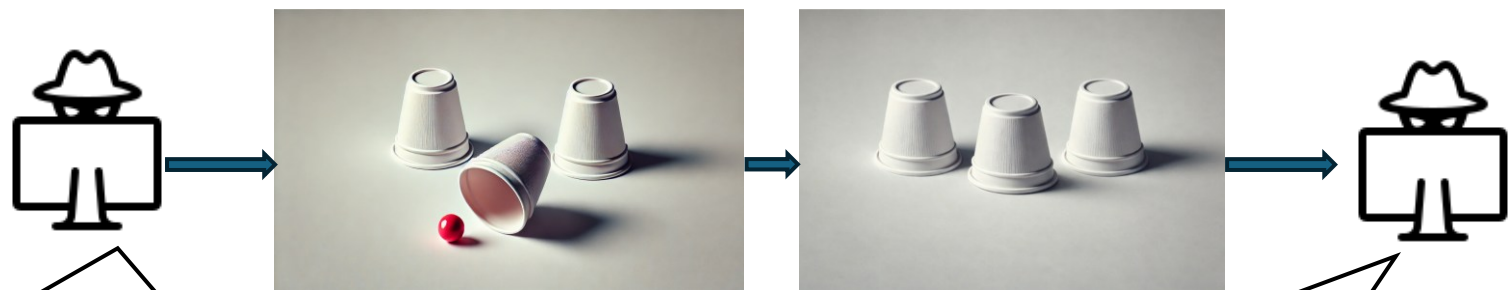


Problem: Static IDS fails to effectively detect stealthy attackers!

II. MTD & Research Idea

MTD (Moving Target Defense) changes configurations to disrupt attackers

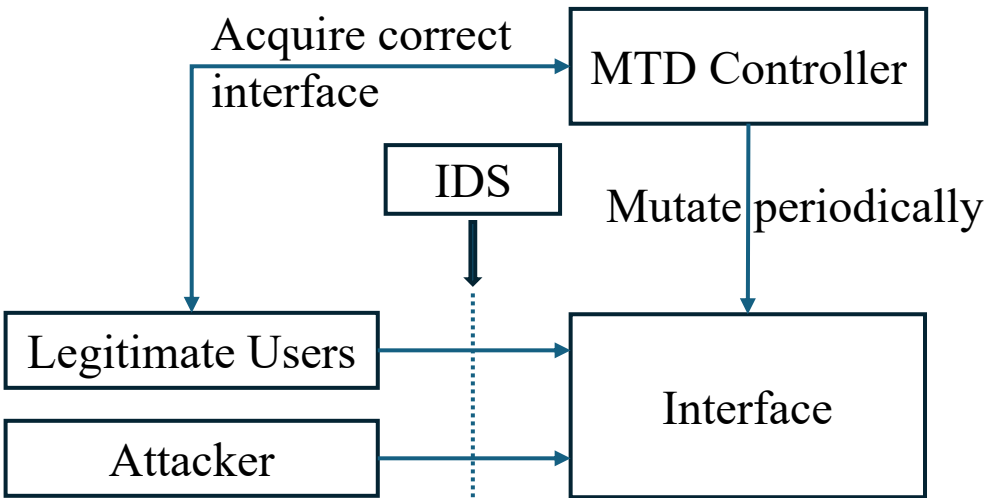
Idea: Inducing Attacker Adaptation with MTD for Exposure



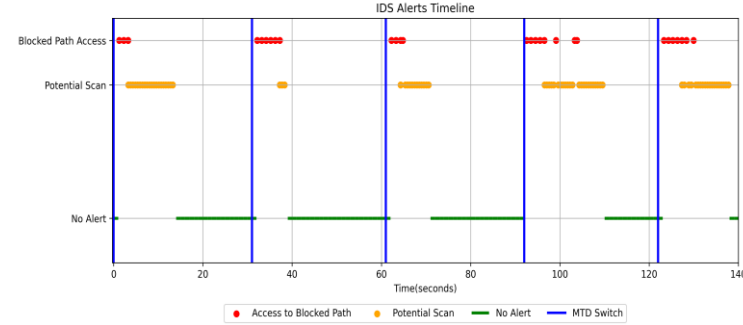
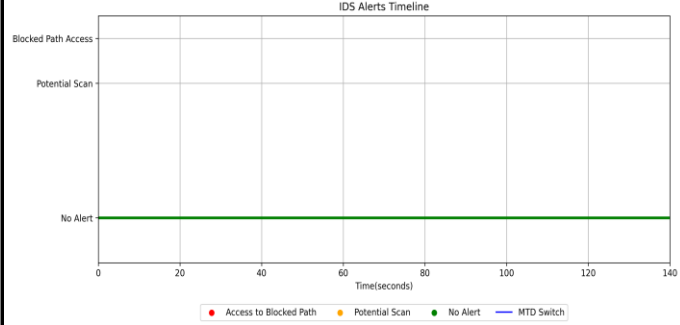
I disguised as normal user. IDS will never alert!

I lost the target! I must find it!

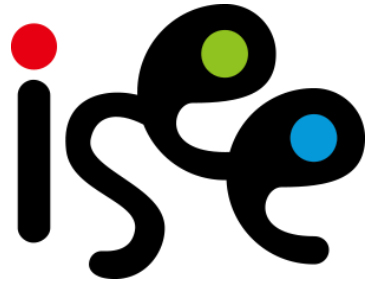
III. Proposed Method



IV. Experiment Results



Successfully converts stealthy attacks into observable IDS alerts



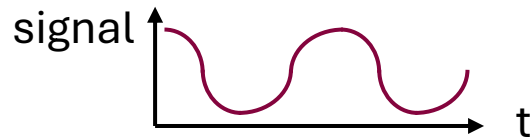
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High-Speed & Stable Microwave Signal with Spin Torque Oscillators (STO)

STO

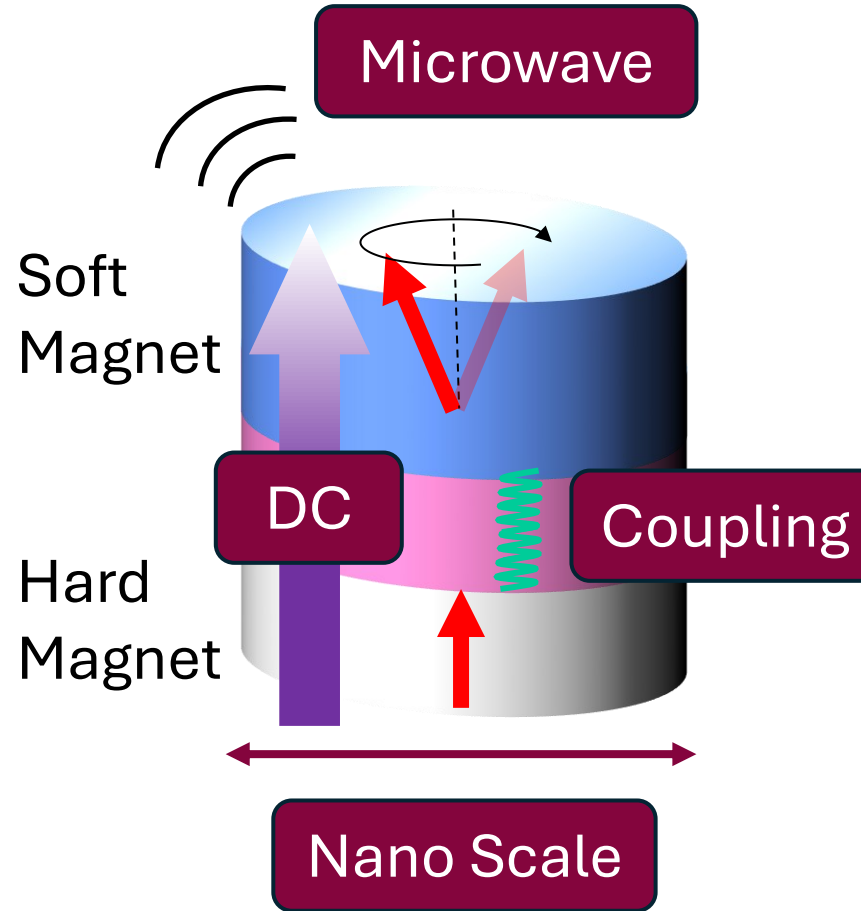
- STO converts DC into GHz microwave



- ✗ Too much DC kills the oscillations



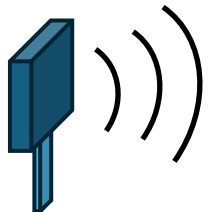
- Needs a creative way to increase frequency



Coupling

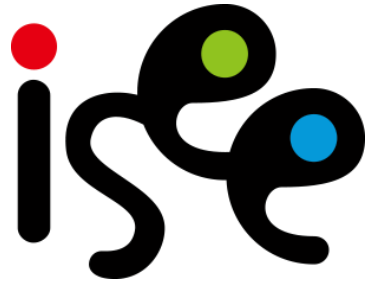
- *Biquadratic exchange coupling* through material engineering
- The coupling forms a Competition with the DC driving force
- **50+ GHz microwave from DC**

✓ Stable & Efficient Signal



STOs will enable **compact & efficient** next-generation communication & sensing devices





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Building Better Memory with Atomic-scale Engineering

Problem: Magnetic memory needs stable magnets, but rough surfaces on SiO₂ substrate reduce performance

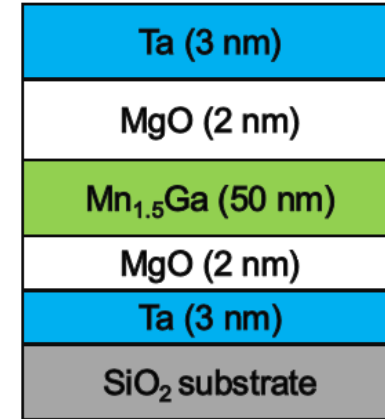
Idea: Insert an ultra-thin cobalt layer (0.8 nm, just a few atoms thick) in thin film stacking structure

Result: Surface becomes much smoother and magnet becomes more stable

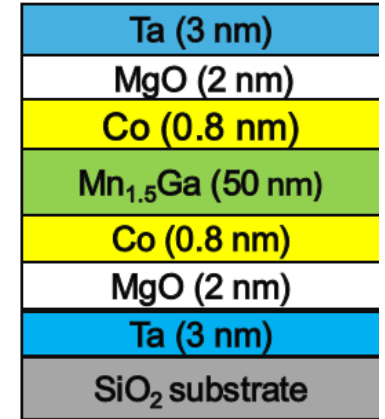
Impact: Cost-effective, safe & better performance for low-power magnetic memory (MRAM) devices

TAKE-AWAY MESSAGE !

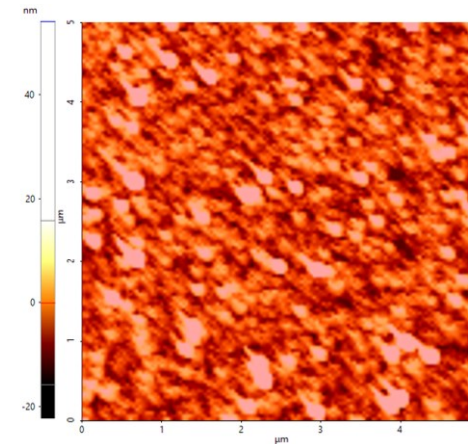
Tiny cobalt layer (0.8nm) makes a big difference in magnetic memory performance!



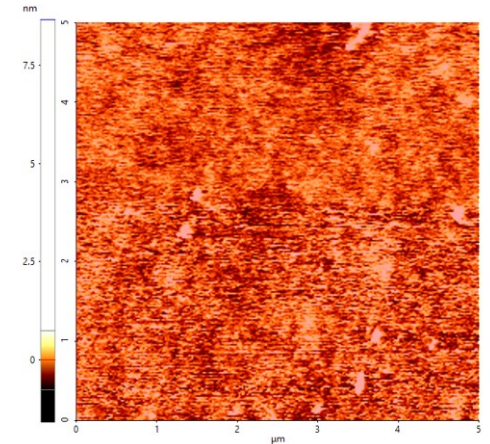
S1



S2

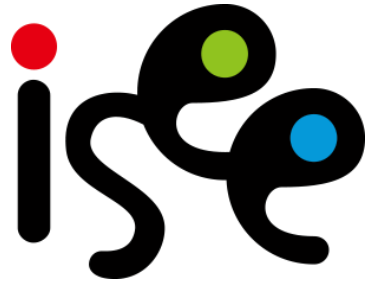


$R_a = 6.1 \text{ nm}$



$R_a = 0.3 \text{ nm}$





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SOLVING THE FORENSIC INVESTIGATION PARADOKS: THE TRUSTWORTHY TRUTH MACHINE

PROBLEM

INCIDENT OCCURS



HOW TO COLLECT VALID & TRUSTED EVIDENCE?



CHALLENGE

1 TAMPER-EVIDENT & CHAIN OF CUSTODY



INTEGRITY & TRACEABILITY OVER TIME
& ACROSS ORGANIZATION

2 PRIVACY & SENSITIVE INFORMATION



OPERATIONAL SECRET, PII, CRITICAL
DETAIL - LIMITED DISCLOSURE

SOLUTION



TEMPER-EVIDENT

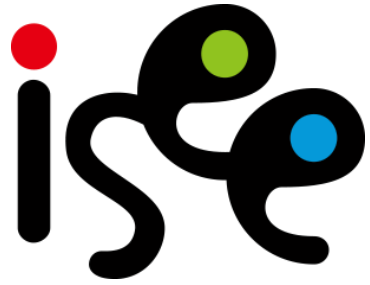


SCALABEL



PRIVACY-PRESERVING

ENSURING EVIDENCE INTEGRITY, SCALABILITY, AND CONFIDENTIALITY



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Interface Engineering of Spin–Orbit Torque and Skyrmions in Magnetic Multilayers

Background

Low-power control of magnetic states is essential for next-generation spintronic devices.

This Study

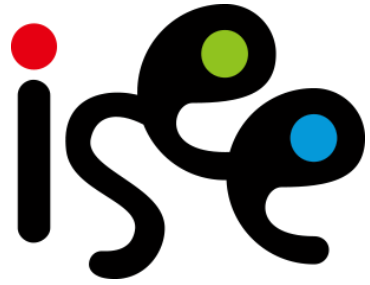
- Interface engineering in Co/Ni/Pt and Pt/Gd/Co/Ni multilayers
- Control of spin–orbit torque and Dzyaloshinskii–Moriya interaction
- Real-space characterization of skyrmions and domain structures
- Quantitative analysis using generalized magneto-optical ellipsometry

Approach

- Ultra-thin Cr, Ti, and Gd interface engineering
- Lorentz TEM and magneto-transport measurements
- Generalized magneto-optical ellipsometry (GME)

Key Findings

- Ultra-thin Cr and Ti interlayers in Co/Ni/Pt systematically tune SOT efficiency and DMI
- Néel-type skyrmions are stabilized in Pt/Gd/Co/Ni multilayers under low driving conditions
- GME quantitatively resolves multi-component magnetization in orthogonal multilayers



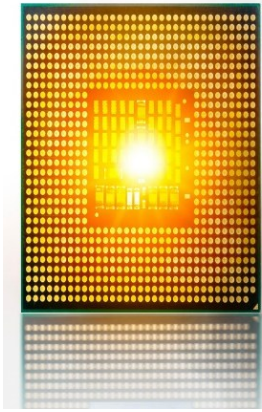
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Opening the Door for Spin in Silicon

Yamashita Lab

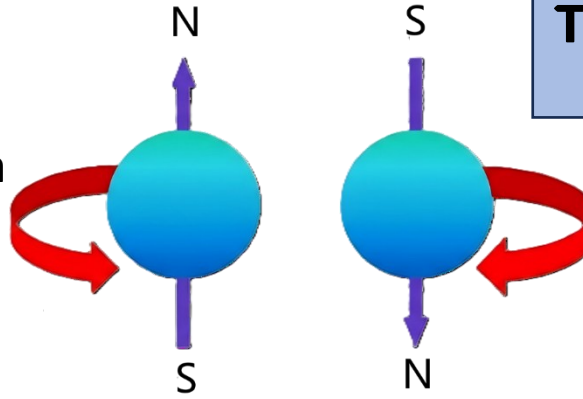
Power wasted as heat



Introduce new degree of freedom

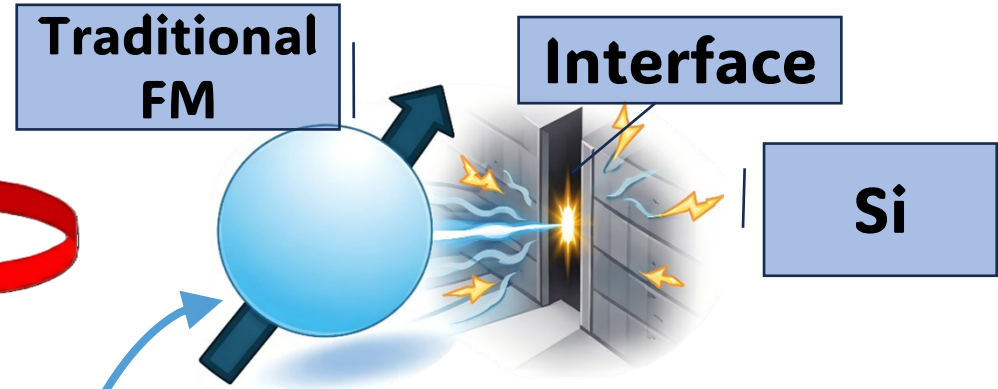


Electron spin



Current challenge

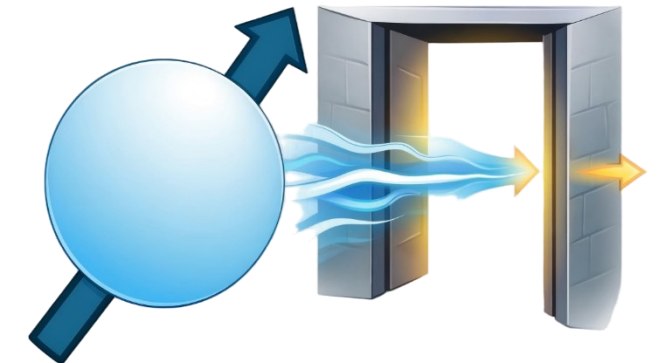
Spin blocked at the interface



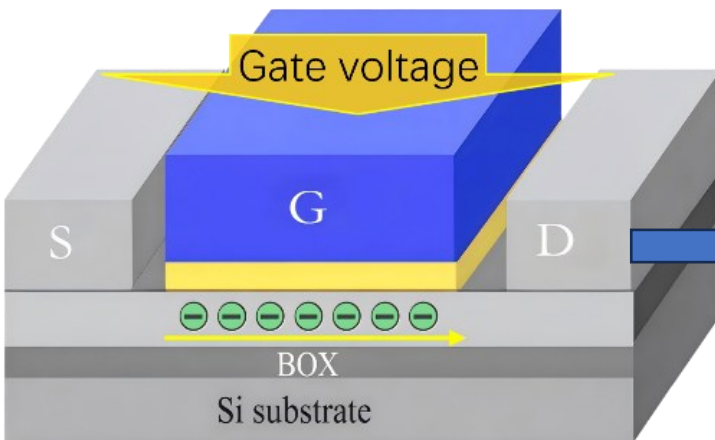
RE-TM alloys as new contacts



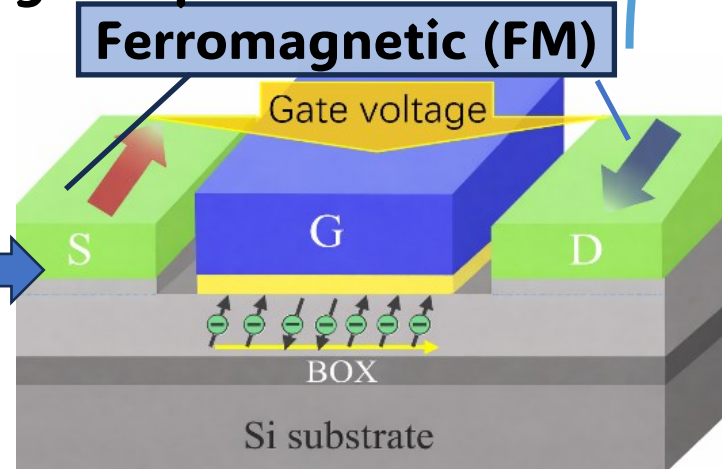
More spin injection achieved

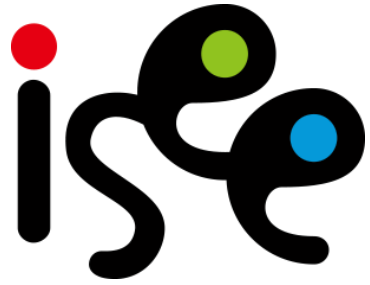


Conventional MOSFET
Charge-based operation



Si-based spin MOSFET
Charge + Spin





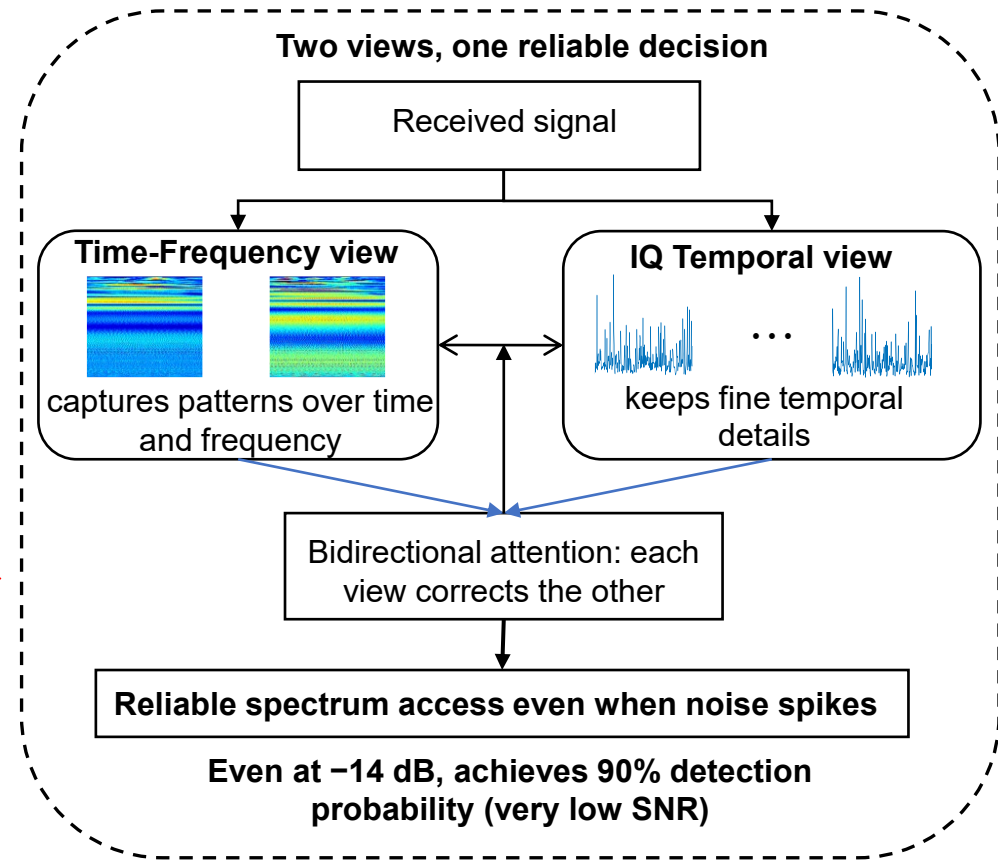
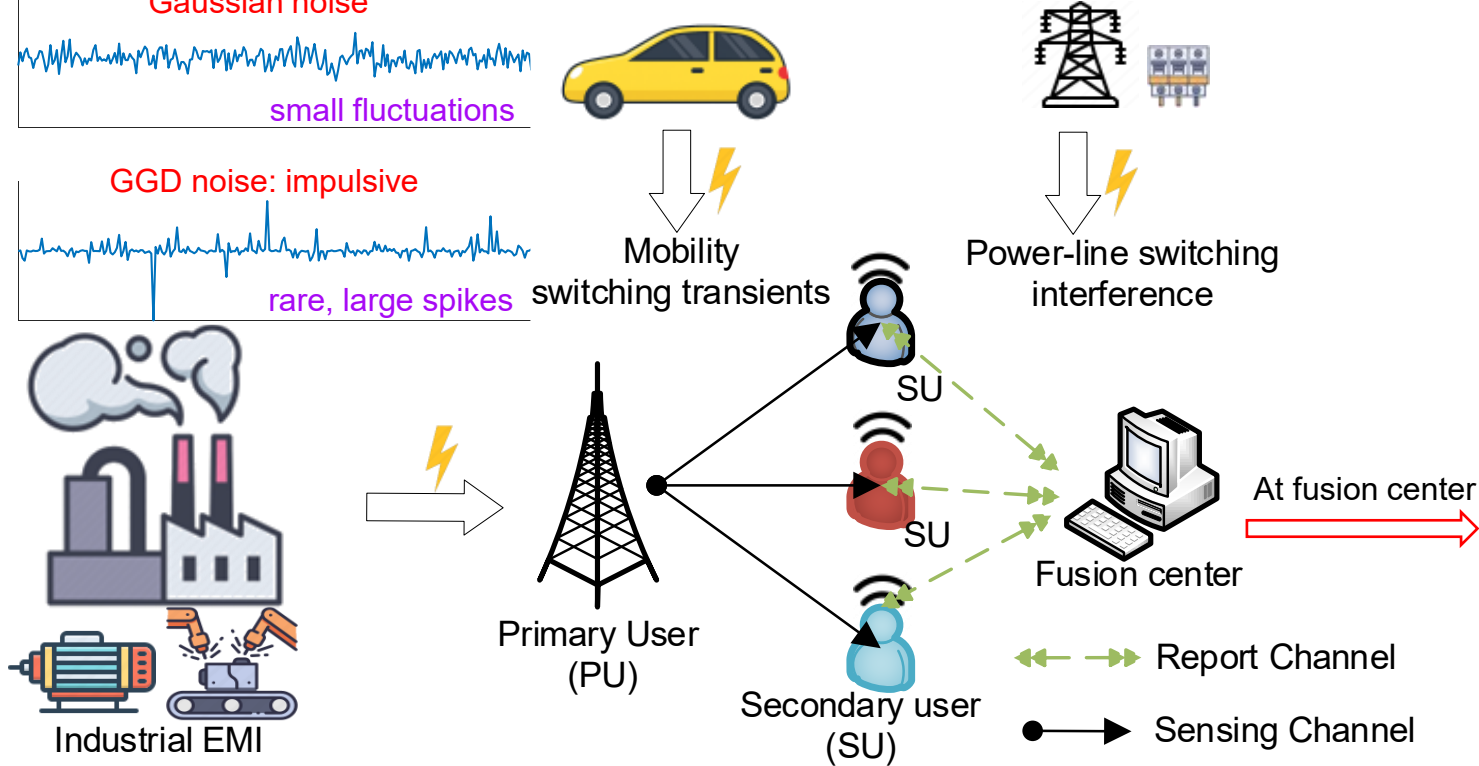
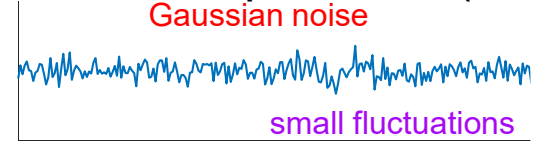
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10:35	10:45	Award celebration & closing	Prof. Ryo Kurazume	

Robust IoT Spectrum Sensing under Generalized Gaussian Noise

Explosive IoT growth makes reliable spectrum sensing essential

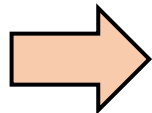
Gaussian vs. Impulsive Noise (GGD)



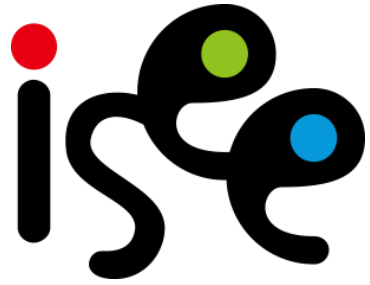
Problem setup: cooperative spectrum sensing under impulsive noise

Expected Outcomes and Impact

- Safer wireless communication for people and systems in harsh environments



Making wireless communication trustworthy where reliability is critical in factories, vehicles, and disaster areas






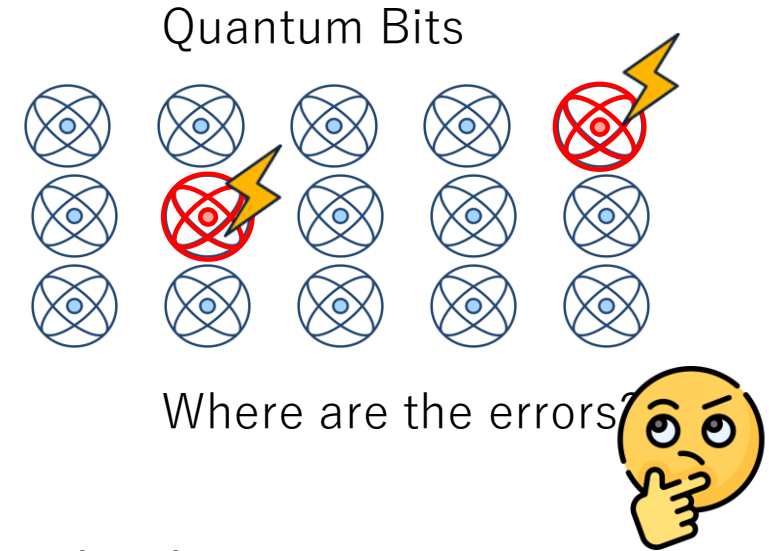
ISEE 3MT Program

Start	End	Title	by	Lab
9:30	9:40	Opening	Prof. Makoto Yokoo, Dean	
9:40	9:44	Enhancing IDS Visibility through MTD-Induced Behavioral Exposure	Liu Rui	IST Koide Lab
9:44	9:48	High-Speed & Stable Microwave Signal with Spin Torque Oscillators (STO)	Cheng Tsz Chung	EEE Yuasa Lab
9:48	9:52	Enhanced Structural Ordering and Surface Smoothness of Mn _{1.5} Ga Films on SiO ₂ Substrate	Amirah Zahrin	EEE Yuasa Lab
9:52	9:56	Trustworthy IIoT Forensics Investigation: Blockchain Anchoring, Scalable Storage, Verifiable Disclosure	Diyanatul Husna	IST Okamura Lab
9:56	10:00	Interface Engineering of Spin–Orbit Torque, Dzyaloshinskii–Moriya Interaction, and Skyrmions in Magnetic Multilayers	Lin Zhang	EEE Yuasa Lab
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Accelerating QLDPC Decoding for Fault-Tolerant Quantum Computing

Fan Wenxuan Ph.D. 1st year
CPC Tanimoto Lab

- Materials Science 
- Cryptography 
- Quantum Machine Learning 



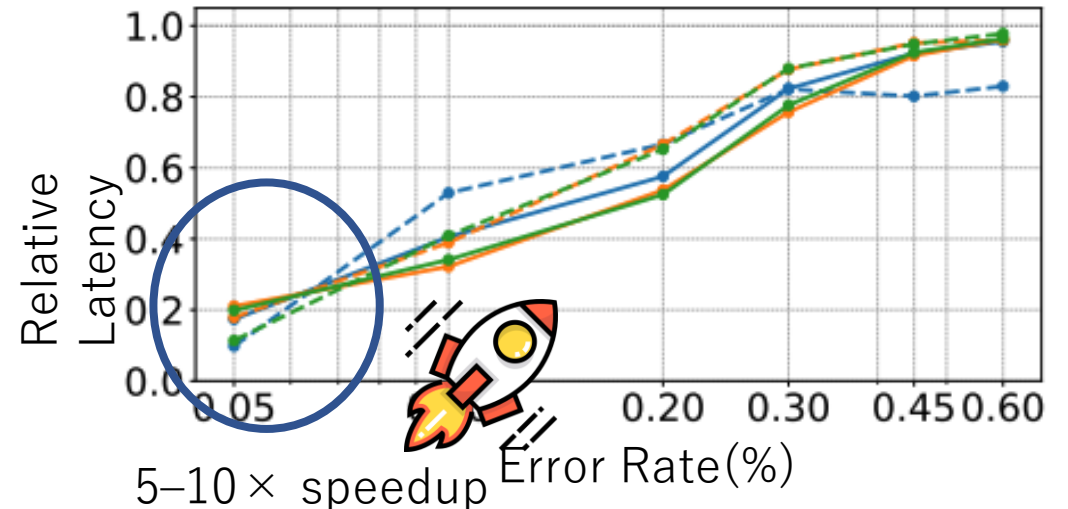
Our Proposed Method:

Classical: hamming code + decoding algorithm

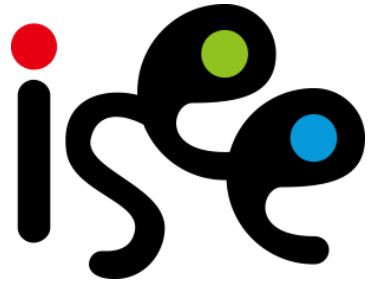
Quantum: surface code/QLDPC code + decoding algorithm



TOO SLOW



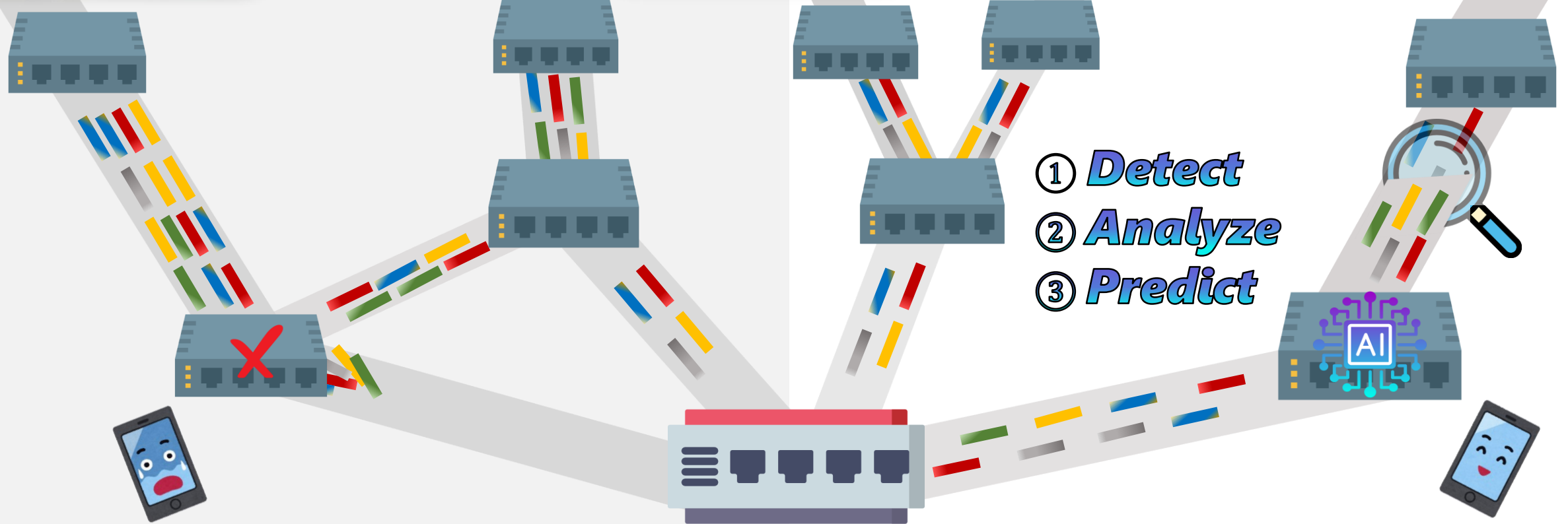
5-10x speedup compared to the original method!



ISEE 3MT Program

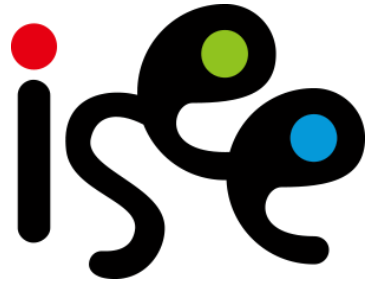
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Computer Networks Get Traffic Jams Too!



- ① *Detect*
- ② *Analyze*
- ③ *Predict*

No Traffic Jam = *Better Service*



ISEE 3MT Program

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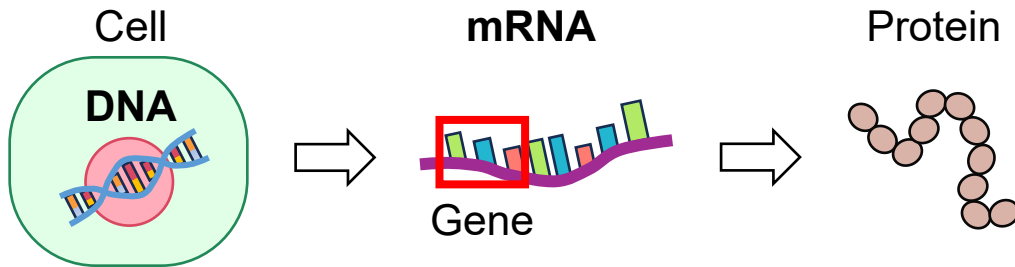
Machine Learning for Spatial Gene Expression Estimation



Presenter: Kaito Shiku; PhD Advisor: Ryoma Bise

1 Background: What is gene expression??

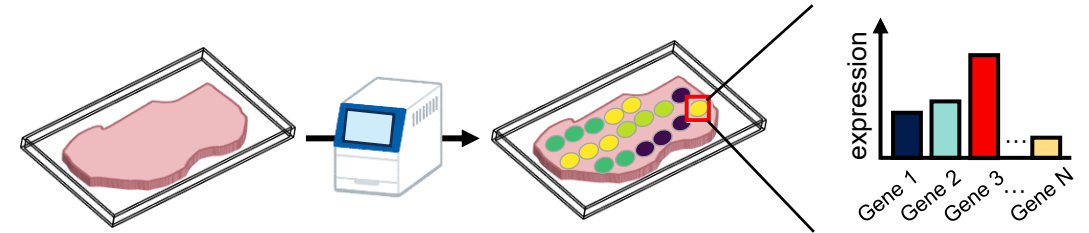
- Gene expression indicates how active a gene is in a cell
- Directly associated with disease progression



Gene expression analysis plays key role in medical research

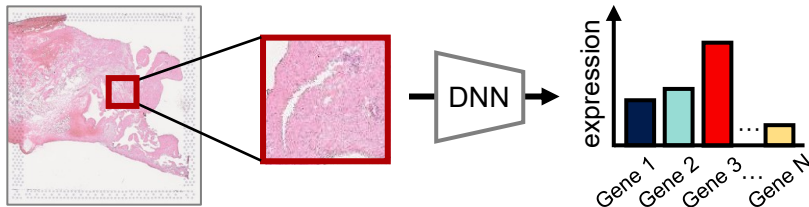
2 Limitation: Cost of Gene Expression Measurement

Latest measurement methods:
Observe “spatially resolved” gene expression in biological tissues



High observation cost... (※ \$2,000–10,000 per sample)

3 Propose: Gene Expression Estimation from Pathology Images by Machine Learning Model



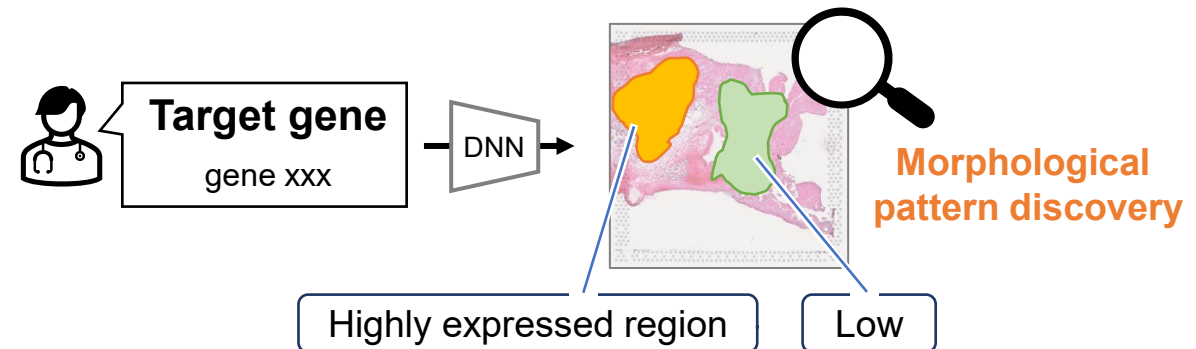
Contribute to observation cost reduction

Difficulties: Observation noise in training data

1. Patient-specific observation scale bias (NeurIPS 2025)
2. Gene-specific missing values (AAAI 2026)

4 Future Direction: Data-driven Novel Knowledge Discovery

Uncover how gene expression influences cellular morphology



Voting time ~10:35



Link from <https://www.isee.kyushu-u.ac.jp/3mt.html>
or direct access to <https://forms.gle/xZjRDvQ7XHcpKrwS7>

九州大学 | ise 大学院システム情報科学府
大学院システム情報科学研究院
Graduate School and Faculty of Information Science and Electrical Engineering

ホーム アクセス お問い合わせ サイトマップ ENGLISH

概要 教育/専攻紹介 研究 入試情報 学生生活 イベント

システム情報3MT

ホーム > イベント > システム情報3MT

3MTについて

1枚のスライドのみを用い、3分間で自分の研究について英語でプレゼンテーションする国際大会です。本学の協定校である、クイーンズランド大学（オーストラリア）で2008年に始まり、今では、85か国900以上の大学が参加している、知名度並びに評価の高いコンペティションとなっています。

3MTは、学生の学術研究、プレゼンテーション、及び研究コミュニケーション力を洗練することを目的としています。また、より多くの人に研究を知ってもらえるように、専門分野外の人にも伝わる説明することが求められます。

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- > 先端サマーセミナー

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JINYU XU	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HAN YUZHOU	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fan Wenxuan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eilaf Mohamed Abaker BABAI	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kaito Shiku	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

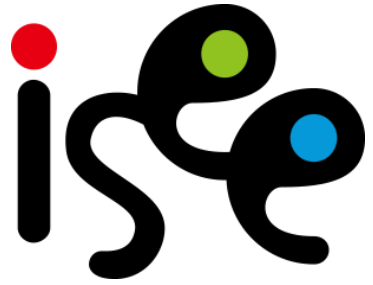
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ISEE 3MT

Award celebration & Closing

from

Prof. Ryo Kurazume