

## In the spotlight



### From sinking to saving: MITRE ATT &CK and D3FEND frameworks for maritime cybersecurity

SUTD Authors: Awais Yousaf, Zhou Jianying  
*Information Systems Technology and Design (ISTD)*

Cybersecurity is a growing concern for maritime sector. Modern ships are practical realism of cyber physical systems that utilize both information technologies and operational technologies. Many frameworks for modeling of cyber attacks exist, but they cover only the tiny part of modern multidimensional attack surfaces. MITRE ATT&CK is the most comprehensive cyber attack modeling framework that covers the multidimensional nature of modern cyber attacks. MITRE D3FEND is similar to ATT&CK knowledge base, but it represents cyber defense framework. In this paper, we aim to demonstrate the modeling with MITRE ATT&CK and MITRE D3FEND frameworks for maritime cybersecurity. An attack scenario against ballast water management system of the ship is considered and modeled with the help of ATT&CK. Defense of the ship is modeled with D3FEND. After modeling of attack and defense by ATT&CK and D3FEND, respectively, for a ship, it is identified that most of the elements of ATT&CK and D3FEND matrices are not specific to maritime systems. But keeping in view the generalization they offer, they can be used by making suitable assumptions or restricting the analysis to appropriate level of abstraction. However, due to the uniqueness of the maritime environment, we suggest creating separate matrices for maritime cyber attacks and defenses in future study.



*"Like IT, OT and mobile, maritime also represents different but an important domain due to maritime specific systems and devices."*

– Awais Yousaf



## Congratulations Dr. Yow Wei Quin

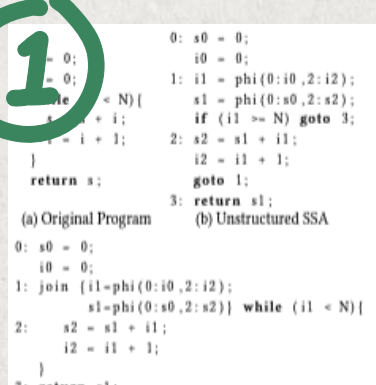


For her paper, 'Brain gray matter morphometry relates to onset age of bilingualism and theory-of-mind in young and older adults' being published on Scientific Reports\*.

\*Scientific Reports has a 2-year impact factor of 4.6 (2022), and is the 5<sup>th</sup> most-cited journal in the world

## TRAILBLAZERS

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### Constructing Structured SSA from FJ

*Proceedings of the 25th ACM International Workshop On Formal Techniques For Java-Like Programs*

SUTD Authors: Kenny Zhuo Ming Lu, Daniel Yu Hian Low  
*ISTD*

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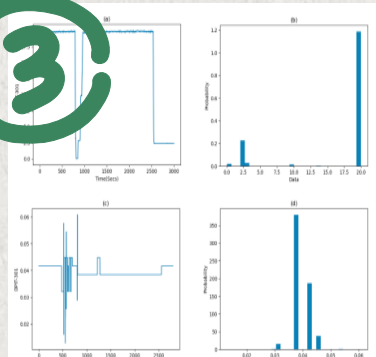


### Obfuscating Community Structure in Complex Network With Evolutionary Divide-and-Conquer Strategy

*IEEE Transactions On Evolutionary Computation*

SUTD Authors: Zhao Jie, Cheong Kang Hao  
*SMT*

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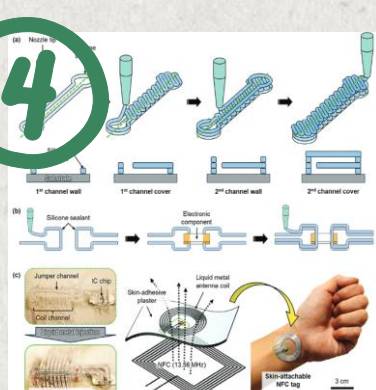


### AICrit: A Design-Enhanced Anomaly Detector and Its Performance Assessment in a Water Treatment Plant

*Applied Sciences-Basel*

SUTD Authors: Gauthama Raman, Aditya Mathur  
*iTrust*

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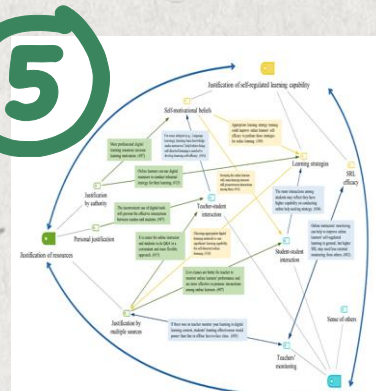


### Flexible and Stretchable Liquid-Metal Microfluidic Electronics Using Directly Printed 3D Microchannel Networks

*Advanced Functional Materials*

SUTD Authors: Kento Yamagishi, Terry Ching, Michinao Hashimoto, Nicole Chian, Martin Tan, Zhou Wenshen, Huang Shao Ying  
*DManD, EPD*

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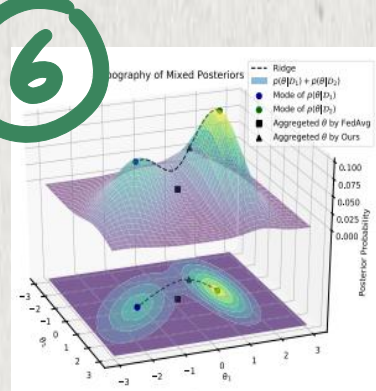


### Clustering digital learning pathway preferences from the perspectives of epistemic justification on self-regulated learning, social presence, and resources

*Heliyon*

SUTD Authors: Huang Qian  
*LKYCIC*

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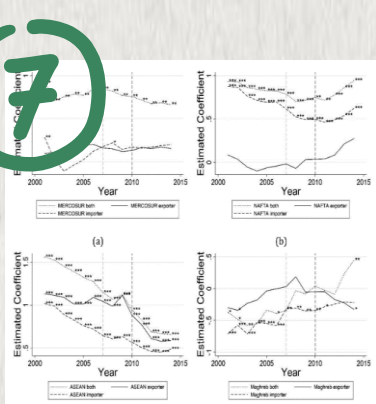


### Self-Supervised 3D Action Representation Learning With Skeleton Cloud Colorization

*IEEE Transactions On Pattern Analysis And Machine Intelligence*

SUTD Authors: Liu Jun  
*ISTD*

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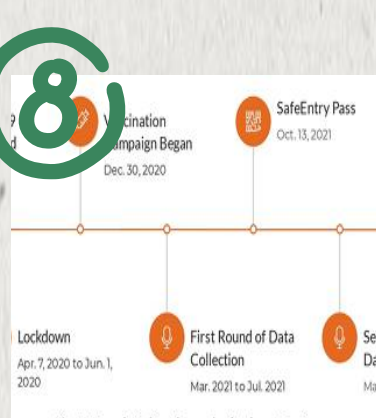


### Regional Trade Agreements and Export Trade Flows: Developing Economies and the Global Financial Crisis of 2007 to 2009

*International Trade Journal*

SUTD Authors: Francisco Benita  
*ESD*

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### Different roles of interpersonal trust and institutional trust in motivating older adults to receive COVID-19 vaccines in Singapore

*Social Science & Medicine*

SUTD Authors: Yeo Shun Yuan  
*HASS*

