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IMPact@SUTD is a regular update featuring works by SUTD Faculty, Researchers, Students and Research Centres/Labs. We hope to create awareness of the Research by SUTD within the SUTD community and beyond. Share with us your SUTD works today so that we can include it in our next update.



**Identifying threats, cybercrime and digital forensic opportunities in Smart City Infrastructure via threat modelling**  
*Forensic Science International: Digital Investigation*

SUTD Author: Yee Ching Tok, Sudipta Chattopadhyay

"Modern infrastructure like smart cities entice adversaries to commit criminal acts. Varied understanding of smart city infrastructure (SCI) and heavy workloads complicate cybercrime investigation. We propose a common definition of SCI, map offences, evidence and identified threats to assist investigators, and make publicly available a threat model template for adoption."

--- [Yee Ching Tok](#)



**The fluorescence quenching mechanism of tetrazine-functionalized fluorogenic labels with integrated  $\pi$ -conjugations: internal conversion to a dark state**  
*Materials Chemistry*

SUTD Author: Shen Tianruo, Yadav Priya, Liu Xiaogang

"Through quantum chemical calculations, we formalized a fluorescence quenching mechanism - internal conversion to a dark state (ICDS) to rationalize the fluorogenicity of tetrazine-functionalized labels with integrated  $\pi$ -conjugations. Based on the understanding of structure-property relationship, we further proposed several design strategies for developing high-performance tetrazine-fused fluorogenic labels with redshifted emission wavelengths and enhanced fluorescence turn-on ratios."

--- [Liu Xiaogang](#)



**Gap solitons on an integrated CMOS chip**  
*Nanophotonics*

SUTD Author: Choi, Ju Won; Sohn, Byoung-Uk; Sahin, Ezgi; Chen, George F. R.; Xing, Peng; Tan, Dawn T. H.

"We explore the gap solitons in a high-quality on-chip CMOS-compatible Bragg grating, enabling the observation of tunable slow light and temporal soliton compression. Our work showcases a new on-chip slow light configuration for optical delay lines and true optical storage, providing a new pathway for the tailored storage for light sources."

--- [Choi Juwon](#)

**A Computational Approach to Identifying Engineering Design Problems**  
*Journal of Mechanical Design*

SUTD Author: Silva, Arlindo

**A metaheuristic approach to optimal morphology in reconfigurable tiling robots**  
*Complex & Intelligent Systems*

SUTD Author: Kalimuthu, Manivannan; Pathmakumar, Thejus; Hayat, Abdullah Aamir; Elara, Mohan Rajesh

**Alzheimer's Dementia Speech (Audio vs. Text): Multi-Modal Machine Learning at High vs. Low Resolution**  
*Applied Sciences-Basel*

SUTD Author: Liu, Huiying; Yang, Shengyuan A

**Effect of swarm density on collective tracking performance**  
*Swarm Intelligence*

SUTD Author: Kwa, Hian Lee

**Efficacy of noisy dynamical decoupling**  
*Physical Review A*

SUTD Author: Xu, Xiansong; Poletti, Dario

**Efficient Synthesis of 2D Mica Nanosheets by Solvothermal and Microwave-Assisted Techniques for CO2 Capture Applications**  
*Materials*

SUTD Author: Weerasinghe, P. Vishakha T.; Wu, Shunlian; Lee, W. P. Cathie; Anariba, Franklin; Wu, Ping

**Hierarchical Aerial Computing for Internet of Things via Cooperation of HAPs and UAVs**  
*IEEE Internet of Things Journal*

SUTD Author: Yuen, Chau

**Human Action Recognition From Various Data Modalities: A Review**  
*IEEE Transactions on Pattern Analysis and Machine Intelligence*

SUTD Author: Sun, Zehua; Liu, Jun

**Inverse design in quantum nanophotonics: combining local-density-of-states and deep learning**  
*Nanophotonics*

SUTD Author: Zhou, Wen-Jie; Wu, Lin

**Multiscale Sparsity Measure Fusion for Bearing Performance Degradation Assessment**  
*IEEE TRANSACTIONS ON PARALLEL AND DISTRIBUTED SYSTEMS*

SUTD Author: Xiong, Zehui

**Plasmons in a two-dimensional nonsymmorphic nodal-line semimetal**  
*Physical Review B*

SUTD Author: Cao, Jin; Feng, Xiaolong; Yang, Shengyuan A.

**Robots among us: ordinary but significant human-robot interactions in the city**  
*AI & Society*

SUTD Author: Chan, Jeffrey Kok Hui; Wang, Yixiao

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