Yuning **JIANG**

yuning-j Yuning-J (+65)80382055 yuning.jiang17@gmail.com ; yuning_j@nus.edu.sg

About me

Experienced Computer Scientist | Senior Researcher | Lecturer.

Currently, I serve as a Research Fellow at the National University of Singapore. My career spans over eight years, dedicated to interdisciplinary research in computer science and information systems, specializing in cybersecurity and data driven applications. In addition to my research skills, I possess extensive experience in project management in computer science disciplines in international environments.

Education

SEP.2022 – AUG.2017 | **PhD in Informatics, University of Skövde, Sweden**
Thesis Topic : *Cyber Vulnerability Analysis for Critical Infrastructures*. (Supervisors : *Prof. Yacine Atif*, *Assoc. Prof. Jianguo Ding*, *Prof. Manfred A. Jeusfeld*, *Assoc. Prof. Birgitta Lindström* and *PhD Christoffer Brax*)

JAN.2016 – SEPT.2014 | **MSc in Electronic Engineering with Business Management, King's College London, United Kingdom**
Thesis Topic : *Case Study of Internet Access in Developing Countries*. (Supervisor : *Prof. Aghvami Hamid*)

JUN.2014 – SEPT.2010 | **BSc (Eng) in Electronics and Information, Beihang University, China**
- Thesis Topic : *Optimal Energy Management Strategy of Fuel Cell Hybrid Power Systems*. (Supervisors : *Prof. Toufik Azib*, *Prof. Yongjun Xie*)
- Exchange to Ecole Supérieure Des Techniques Aéronautiques Et De Construction Automobile, France from Jan 2014 to June 2014.

Experience

Present – OCT.2023 | **Research Fellow** , National University of Singapore, Singapore
- Led a team to develop a pipeline for vulnerability retrieval
  - Architected a data pipeline that integrated data from various sources to resolve inconsistencies.
  - Designed graph-based methods for filtering false-positive vulnerabilities.
  - Fine-tuned BERT based NER and RE models to extract vulnerability-related entities.
  - Leveraged GPT for data labeling automation.
- Orchestrated a collaborative project with NCS Pte Ltd to develop algorithms for threat hunting.
  - Constructed multi-step graph-based attack scenarios using intrusion detection system data.
  - Enhanced threat intelligence by mapping alert messages to MITRE ATT&CK tactics and techniques using hierarchical-aware text classification model.
- Performed individual research on risk aggregation for complex systems.

OCT.2023 – OCT.2022 | **Research Fellow** , Nanyang Technological University, Singapore
- Led the development of a Knowledge Graph Based tool to streamline software testing for WeBank. (Python, Neo4j, RoBERTa, Pytorch, Hanlp, Glove, GPT-x, GraphSage, Github)
  - Achieved 85% accuracy in named entity recognition using RoBERTa.
  - Transformed complex testing data into a structured knowledge graph, optimizing workflows and testing analysis through advanced text processing and deep learning.
  - Managed full project lifecycle : coding, testing, implementation, and documentation.
- Led research on gamification in cybersecurity.

OCT.2023 – MAR.2023 | **Visiting Research Fellow** , China-Singapore International Joint Research Institute (CSIJRI), China
Orchestrated collaborative research activities to bridge the collaborations between research team in NTU and software development team in CSIJRI.

SEP.2022 – AUG.2017 | **Doctoral Thesis** , University of Skövde, Sweden
- Designed and developed models to support system-wide dependence analysis and cybersecurity assessment. (Python, MongoDB, Redis, Keras, Tensorflow, NumPy, sci-kit-learn, Pandas, Gensim, SecuriCAD)
  - Organized cybersecurity workshops for power-grid stakeholders.
  - Co-founded a startup, Norgald, and secured collaboration with Chalmers Venture
  - Secured 113,000 SEK in research validation funding, affirming project viability and impact.
  - Conducted case studies with industry partners, identifying critical vulnerabilities.
  - Constructed an Ensemble machine learning pipeline to enhance vulnerability detection accuracy.

Sep.2015 – Jan.2015 | **Research Projects** , King's College London, United Kingdom
- Smart City Multi-Mode Transportation Project (Research Project in one Master course) : Predicted which transportation people prefer to choose in varying traffic scenarios.
- Case Study of Internet Access in Developing Countries (Master Thesis Project) : Proposed a cost-effective and secure Internet communication infrastructure in emerging economic areas.

JUN.2017 – AUG.2016 | **Data Product Manager** , Beijing Changjiu Logistics Co., Ltd., China
Led a team of 10 in developing data-driven products to predict car dealership loan risks with 85% accuracy. (Python, Gradient Boosting Decision Tree, Data Visualization, MySQL, PostgreSQL)
- Orchestrated data management and analytics for 6600+ car dealers across 100+ brands, establishing a comprehensive database for risk analysis and decision-making.
- Provided strategic consultancy to partner financial institutions on real-time risk evaluation.
- Facilitated cross-functional collaboration with operations and marketing teams.

Jun.2014 – Jan.2014 | **Research Project** , Ecole Supérieure Des Techniques Aéronautiques Et De Construction Automobile, France
Optimal Energy Management Strategy of Fuel Cell Hybrid Power Systems : Designed a system based on fuzzy logic control and stimulated using Matlab.

JAN.2014 – NOV.2013 | **Analyst Intern** , Ericsson Communication, China
Utilized Tableau and MySQL for data analytics and visualization tasks.
- Implemented data mining techniques using MySQL to extract operational data from large datasets.
- Collaborated with operational teams to tailor visualizations to their specific needs.

Teaching and Mentoring

OCT.2023 – OCT.2022 | **Teaching Assistant** , Nanyang Technological University, Singapore
- Supervised undergraduate thesis projects :
  - Thesis title : "Leveraging Knowledge Graphs for Microfinance Analysis".
  - Thesis title : "Advancing Logical Analysis in Large Language Models".
- Supervised lab intern on project title : "Large Language Model Application in Microfinance".

SEP.2022 – AUG.2017 | **Lecturer** , University of Skövde, Sweden
- Master Course Module *Cybersecurity for IoT and Critical Infrastructures* (Module Co-Leader) :
  - Developed a new course on IoT cybersecurity based on research outcome from *ELVIRA* project.
  - Prepared teaching materials and delivered lectures both online and on-site.
  - Organized and led hands-on lab seminars.
- Master Course Module *Information and Cyber Security : Principles and Practices* (Module Leader) :
  - Developed the module teaching materials and delivered the teaching contents.
  - Curated cybersecurity training tailored for industrial professionals.
  - Developed and organized industrial workshops for Master students.
  - Managed the course team (e.g., student attendance, course survey, student engagement activities).
- Undergraduate Course Module *Object-Oriented Programming (OOP)* (Module Co-Leader) :
  - Prepared and delivered teaching materials.
  - Organized and led lab activities on OOP using JAVA.
- Undergraduate Course Module *Algorithm and Data Structure* :
  - Prepared and delivered the module.
  - Organized and led lab seminars using C++ for game development.
  - Ensured understanding of course content through practical exercises and assessments.
- Other activities :
  - School Teaching Panel member.
  - School open-day demonstrator.
  - Bridged mentors and doctoral students through the PhD board.

SEP.2022 – AUG.2017 | **Teaching Training and Certificate** , University of Skövde, Sweden
- Training for Higher Education Teaching :
  - Teaching and Learning in Higher Education I.
  - Teaching and Learning in Higher Education II.

Other Activities

Present – Mar.2024 | **Guest Editor** for :
- Journal of *Intelligent Communication*

Present – AUG.2020 | **Reviewer** for the following :
- *Business & Information Systems Engineering (2023)*
- *IEEE Transactions on Intelligent Vehicles (2023)*
- *Swedish Production Symposium (2022)*
- *Computers & Security (2021)*

Oct.2022 – Oct.2022 | **Co-Organizer** for :
- *Special Session of "Digital Games as Socio/Technical Systems" in IEEE International Conference on e-Business Engineering (ICEBE)*

Present – OCT.2017 | **Presentations in Conferences** :
- *ER 2023 Journal First Session in The 42nd International Conference on Conceptual Modeling, (2023)*
- *The 16th International Conference on Availability, Reliability and Security (ARES) (2021)*
- *The 13th International Conference on Security of Information and Networks (2020)*
- *The 14th International Conference on Risks and Security of Internet and Systems (2019)*
- *International Conference on Critical Information Infrastructures Security (2019)*
- *The 22nd International Enterprise Distributed Object Computing Conference (EDOC) (2018)*
- *International Conference on Critical Information Infrastructures Security (2017)*

OCT.2022 – OCT.2017 | **Yearly presentations** :
- *SWITS (Swedish IT Security Network) seminar*

SEP.2022 – AUG.2017 | **PhD Board Member** , University of Skövde, Sweden
Organized panel talks, participated in interviews with senior researchers, and attended monthly meetings to discuss matters relevant to doctoral researchers.

JAN.2016 – APR.2014 | **Mandarin Teaching Assistant** , London Chinese School, United Kingdom
Assisted mandarin lectures (25-30 individuals).

JAN.2016 – NOV.2014 | **Visiting Lecture in GCSE courses** , Team Up Hub, United Kingdom
Gave lecture and mentoring sessions in GCSE topics (2-3 individuals).

Honors and Awards

2022 Länsförsäkringar Skaraborg Prize, issued by Skaraborgs Academy on Outstanding PhD Thesis
2021 Prize for AI, Art and Society in "SAAI Factory - Hackathon on Art and AI", issued by Super Artistic AI FACTORY
2021 Anthony Parker Memorial Prize, issued by R. U. Hacking? (Reading University Hacking)
2019 Young CRITIS Award, issued by the 14th International Conference on Critical Information Infrastructure Security

Funding and Scholarship

2022 Vinnova funding on applied research validation
2019 IPSI (Industrial PhD School in Informatics) Scholarship
2017 European Union - Internal Security Fund
2014 BeiHang University YuanHang Global Study Scholarship

Skills

Programming	Python, Objective-C, Java
Database	MongoDB, Microsoft SQL Server, MySQL, Apache Spark
ML/NLP	Keras, Tensorflow, NumPy, sci-kit-learn, Pandas, PyTorch, Gensim
Solid Knowledge	Algorithms, System Architecture, Knowledge Modeling, Cybersecurity, NLP
Tools	Neo4j, Fortinet SIEM/SOAR; Rapid7 InsightVM, Tenable Vulnerability Management
Interpersonal Skills	Public Speaking, Consulting, Technical Mentoring, Problem-Solving, Leadership
Languages	Mandarin, English

Recent Publications

2024 **Jiang, Y.**, Oo, N., Meng, Q., Sikdar, B., & Lim, H. (2024). *VulRG : Multi-Level Explainable Vulnerability Patch Ranking for Complex Systems Using Graphs* (Paper Under Review)

2024 **Jiang, Y.**, Oo, N., Meng, Q., Sikdar, B., & Lim, H. (2024). *MITRE ATT&CK Application in Threat Intelligence and The Way Forward* (Paper Under Review)

2024 **Jiang, Y.**, Oo, N., Meng, Q., Sikdar, B., & Lim, H. (2024). *SoK : Vulnerability Prioritization in Complex Systems* (Paper Under Review)

2024 Meng, Q., **Jiang, Y.**, Oo, N., Sikdar, B., & Lim, H. (2024). M^2ASK *: A Correlation-Based Multi-Step Attack Scenario Detection Framework Using MITRE ATT&CK Mapping* (Poster Accepted in ACM CCS 2024)

2024 **Jiang, Y.**, Jeusfeld, M., Mosaad, M., & Oo, N. (2024). *Enterprise architecture modeling for cybersecurity analysis in critical infrastructures-A systematic literature review*. In : International Journal of Critical Infrastructure Protection, 100700. (Paper Link)

2024 **Jiang, Y.**, Wang, W., Ding, J., Lu, X., & Jing, Y. (2024). *Leveraging Digital Twin Technology for Enhanced Cybersecurity in Cyber–Physical Production Systems.* In : Future Internet 2024, 16, 134. (Paper Link)

2023 **Jiang, Y.**, Li, R., Xing, Z., & Zhao, X. (2023). *A Method for Software Test Case Recommendation based on Knowledge Graph* (Patent Link)

2023 **Jiang, Y.**, Jeusfeld, M., Ding, J., & Sandahl, E. (2023). *Model-Based Cybersecurity Analysis : Extending Enterprise Modeling to Critical Infrastructure Cybersecurity* In : Business & Information Systems Engineering, 1-34. (Paper Link)

2022 **Jiang, Y.** (2022). *Vulnerability Analysis for Critical Infrastructures.* (Thesis Link)

2022 **Jiang, Y.**, & Atif, Y. (2022). *Towards automatic discovery and assessment of vulnerability severity in cyber-physical systems.*. Array, p.100209. (Paper Link)

2021 **Jiang, Y.**, & Atif, Y. (2021). *A Selective Ensemble Model for Cognitive Cybersecurity Analysis*. Journal of Network and Computer Applications, 193, 103210. (Paper Link)

2021 **Jiang, Y.**, Jeusfeld, M., & Ding, J. (2021, August). *Evaluating the Data Inconsistency of Open-Source Vulnerability Repositories*. In 4th International Workshop on Cyber Threat Intelligence Management (CyberTIM 2021) of 16th International Conference on Availability, Reliability and Security (ARES 2021). (Paper Link)

2020 **Jiang, Y.**, & Atif, Y. (2020, November). *An Approach to Discover and Assess Vulnerability Severity Automatically in Cyber-Physical Systems*. In 13th International Conference on Security of Information and Networks. (pp. 1-8). (Paper Link)

2019 **Jiang, Y.**, Atif, Y., Ding, J., & Wang, W. (2019, October). *A Semantic Framework with Humans in the Loop for Vulnerability-Assessment in Cyber-Physical Production Systems*. In International Conference on Risks and Security of Internet and Systems. (pp. 128-143). Springer, Cham. (Paper Link)

2019 **Jiang, Y.**, Atif, Y., Ding, J. (2019, September). *Cyber-Physical Systems Security Based on a Cross-Linked and Correlated Vulnerability Database.* In International Conference on Critical Information Infrastructures Security. (pp. 71-82). Springer, Cham. (Paper Link)

2018 **Jiang, Y.**, Jeusfeld, M., Atif, Y., Ding, J., Brax, C., Nero, E. (2018, October). *A Language and Repository for Cyber Security of Smart Grids*. In 2018 IEEE 22nd International Enterprise Distributed Object Computing Conference (EDOC). (pp. 164-170). IEEE. (Paper Link)