

Dr. Kristina P. Sinaga

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[🎓 Google Scholar](#) [📍 Pisa, Italy](#)

“Better to be hated for telling the truth than loved for living in a lie. Integrity in research and life builds lasting foundations.”

—Personal Philosophy

RESEARCH EXPERTISE & KEYWORDS

Machine Learning Federated Learning Multi-View Clustering Data Science
Applied Mathematics Statistical Modeling Algorithm Development
Privacy-Preserving AI
Dimensionality Reduction Unsupervised Learning Data Integration
Computational Mathematics Research Leadership Academic Publishing
International Collaboration

CORE COMPETENCIES

- | | |
|--------------------------|-----------------------------------|
| Machine Learning | Python, R, MATLAB |
| Data Science | TensorFlow, PyTorch, scikit-learn |
| Federated Learning | Cloud Computing |
| Multi-View Clustering | Docker, Git |
| Algorithm Development | Data Integration |
| Statistical Analysis | Privacy-Preserving AI |
| Dimensionality Reduction | Research Leadership |

RESEARCH INTERESTS & SPECIALIZATIONS

Primary Research Focus Areas

Clustering Methodologies: Developing innovative k-means and fuzzy c-means algorithms for single and multi-view data using novel mathematical formulations. Focus on advancing algorithmic efficiency and accuracy for complex heterogeneous data structures.

Pattern Recognition & Dimensionality Reduction: Employing clustering-based dimensionality reduction techniques for feature selection and optimization. Research emphasis on developing scalable pattern recognition frameworks for high-dimensional data analysis.

Federated Learning & Privacy-Preserving AI: Adapting conventional machine learning algorithms to address privacy concerns in multi-client, multi-view environments. Pioneering research in distributed learning systems with enhanced data security and communication efficiency.

PROFESSIONAL SUMMARY

Results-driven Applied Mathematics Ph.D. and Postdoctoral Researcher with 7+ years of experience in **machine learning, data science, multi-view clustering,** and **federated learning** for heterogeneous data systems. Expert in **privacy-preserving machine learning, algorithm development,** and **statistical modeling** for large-scale, multi-client environments.

Research Excellence: Proven track record of publishing in top-tier journals (IEEE, Elsevier, MDPI) with **2,800+ citations** and leading international research collaborations. **Teaching Impact:** Delivered courses to 200+ students achieving 35% increase in engagement. **Career Objective:** To leverage advanced mathematical and AI expertise to drive innovation in data-driven organizations, focusing on **AI research, data science,** and **applied machine learning** roles.

EDUCATION

Ph.D. in Applied Mathematics

2016 - 2020

Chung Yuan Christian University, Taiwan

- ▷ **Dissertation:** “Multi-view Fuzzy Clustering For Algorithms Multi-View data (Chinese: 多視圖數據模糊聚類演算法)”
- ▷ **Research Focus:** Machine learning, multi-view clustering, dimensionality reduction, algorithmic optimization
- ▷ **Academic Excellence:** Graduated with Honors | Published 6 journal articles during doctoral studies
- ▷ **International Impact:** Research cited 2,800+ times | Featured in IEEE Access Popular Documents
- ▷ **Conference Presentations:** 1 international conference with global academic networking

Master of Science in Mathematics

2013 - 2015

University of Sumatera Utara, Indonesia

- ▷ **Thesis:** “Stochastic Optimization Models for Emergency Service Location Problems”
- ▷ **Research Area:** Operations research, optimization theory, mathematical modeling
- ▷ **Achievement:** Developed novel stochastic optimization frameworks for real-world applications

Bachelor of Science in Mathematics

2008 - 2013

University of Sumatera Utara, Indonesia

- ▷ **Academic Distinction:** Graduated with high honors
- ▷ **Research Project:** Regional economic analysis using mathematical modeling
- ▷ **Foundation:** Strong mathematical foundation in analysis, algebra, and applied mathematics

ACADEMIC & RESEARCH EXPERIENCE

Postdoctoral Researcher

October 2024 - Present

Institute of Information Science and Technologies (ISTI-CNR), Italy

- ▷ **Algorithm Development:** Designed and implemented novel clustering algorithms for heterogeneous data, achieving 20-30% improvement in clustering accuracy on benchmark datasets
- ▷ **Publication Impact:** Authored 3+ high-impact papers in (non) federated unsupervised machine learning (on progress/in preparing/under review/accepted)
- ▷ **Current Focus:** Currently developing advanced clustering algorithms for heterogeneous data analysis and privacy-preserving machine learning frameworks
- ▷ **Peer Review Service:** Served as reviewer for IEEE Access journal, Multiple MDPI Journals, Elsevier on Computer Methods and Programs in Biomedicine, contributing to academic community standards and quality assurance

Independent Researcher

Self-Directed Research

- **Research Autonomy:** Conducted independent research in machine learning and clustering algorithms, demonstrating self-motivation and research independence
- **Academic Achievement:** Successfully secured arXiv endorsement and published preprint, showcasing ability to produce quality research without institutional support
- **Continuous Productivity:** Maintained active research productivity during career transition, contributing to the advancement of algorithmic methodologies
- **Innovation Focus:** Developed novel approaches to multi-view clustering and federated learning frameworks during independent research period
- **Publication Preparation:** Prepared multiple manuscripts for submission to high-impact journals, demonstrating commitment to academic excellence
- **Peer Review Service:** Continued serving as reviewer for IEEE Access journal, Elsevier on Information Fusion, contributing to academic community standards and quality assurance
- **Networking:** Engaged with academic community through online platforms and conferences, maintaining professional connections and staying updated on latest research trends
- **Skill Enhancement:** Continued professional development through online courses and workshops, enhancing expertise in machine learning frameworks and algorithmic methodologies
- **Strategic Planning:** Engaged in strategic career planning and professional development, preparing for transition to advanced research positions
- **Research Focus:** Continued focus on multi-view clustering and federated learning, with emphasis on algorithmic innovation and theoretical advancements
- **Publication Impact:** Contributed to the academic community through preprint publication, enhancing visibility and impact of research work
- **Collaboration:** Maintained collaborative relationships with previous research teams, facilitating knowledge exchange and potential future collaborations

Postdoctoral Fellow

March 2023 - March 2024

Department of Applied Mathematics, Chung Yuan Christian University, Taiwan

- **Breakthrough Research:** Developed breakthrough single and multi-view clustering algorithms in both federated and non-federated environments, resulting in publication in IEEE TPAMI
- **Theoretical Advancement:** Advanced theoretical foundations of privacy-preserving machine learning and federated clustering methodologies
- **Algorithm Innovation:** Established novel algorithmic frameworks that significantly improved clustering performance in heterogeneous data environments
- **Methodology Development:** Designed new algorithms for single-view, multi-view k-means (MVKM) and multi-view fuzzy c-means (MVFCM) in both non-federated and federated environments
- **Implementation Excellence:** Provided comprehensive MATLAB code implementations for multiple resources and multiple clients/users data processing problems
- **Experimental Validation:** Conducted extensive experiments and simulations on various publicly available multi-view datasets with thorough result interpretation
- **Peer Review Service:** Served as reviewer for IEEE Access journal, Elsevier on Information Fusion, Elsevier on Applied Soft Computing, contributing to academic community standards and quality assurance

Professional Development & Continuous Learning

April 2022 - February 2023

Self-Directed Professional Development

- **Advanced Certifications:** Completed Machine Learning Specialization and DeepLearning.AI TensorFlow Developer Specialization on Coursera, strengthening foundation in modern AI frameworks
- **Continuous Learning:** Pursued multiple specialized courses in machine learning, data science, and emerging technologies through comprehensive online learning platforms
- **Strategic Planning:** Engaged in strategic career planning and professional development, preparing for transition to advanced research positions
- **Skill Enhancement:** Strengthened technical expertise in TensorFlow, PyTorch, and advanced machine learning methodologies

Lecturer Specialist S3 (Assistant Professor Level)

November 2020 - March 2022

Bina Nusantara University, Indonesia

- **Teaching Excellence:** Delivered courses in Mathematics and Data Analysis to 200+ students, achieving a 35% increase in student engagement and improved completion rates
- **Research Supervision:** Supervised 10+ student research projects, fostering critical thinking and innovative problem-solving approaches
- **Curriculum Development:** Developed and updated curriculum materials to align with industry standards and emerging technologies
- **Student Engagement:** Achieved 35% increase in student engagement and 90%+ course completion rates through innovative teaching methodologies
- **Assessment Innovation:** Implemented project-based learning and real-world case studies, improving critical thinking skills by 40%
- **Faculty Leadership:** Served on curriculum committee and academic standards review board
- **Peer Review Service:** Served as reviewer for IEEE Access journal and Elsevier on Information Fusion

PhD Research Student

September 2016 - June 2020

Chung Yuan Christian University, Taiwan

- **Research Innovation:** Developed novel multi-view fuzzy clustering algorithms, published 6 journal articles, 2 preprints, and 4 conference papers (2,800+ citations)
- **International Recognition:** Presented research at 1 international conference, building global academic networks and fostering knowledge exchange
- **Collaborative Research:** Collaborated with interdisciplinary teams to advance algorithmic optimization and data integration methods
- **Citation Impact:** Research cited 2,800+ times with h-index of 7, demonstrating substantial impact on the field
- **Methodological Advancement:** Pioneered innovative methodological frameworks for multi-view fuzzy clustering algorithms with applications to complex heterogeneous data systems
- **Cross-cultural Collaboration:** Developed strong international research partnerships through collaborative projects and academic exchanges

Academic Service to Society

2011 - Present

Various Locations

- **Community Outreach:** Contributed to community outreach programs bringing STEM education to underserved communities and educational institutions
- **Science Communication:** Participated in science communication events and public lectures focused on making mathematical concepts accessible to diverse audiences
- **Mentorship Impact:** Provided mentorship and guidance to students across different institutions, fostering academic growth outside formal teaching contexts
- **Diversity & Inclusion:** Supported diversity and inclusion initiatives through collaborative efforts with educational partners and community organizations
- **Balanced Service:** Maintained a balanced approach to service responsibilities alongside ongoing research and teaching commitments

TEACHING EXPERIENCE

Teaching Impact Summary

Total Students Taught: 180+ unique students **Student Demographics:** 80+ undergraduate, 100+ graduate **Teaching Formats:** Regular & Online Programs **Event Moderation:** 4 international academic events (2020-2021)

Teaching Philosophy & Impact: Delivered comprehensive instruction across undergraduate and graduate programs, combining traditional and innovative online pedagogical approaches. Successfully moderated international academic events with participants from universities across Indonesia and abroad, fostering cross-cultural academic collaboration and knowledge exchange.

Masters in Information Systems Management

2020 - 2022

Bina Nusantara University

- **Business Intelligence and Analytics:** Taught both regular and online programs focusing on data-driven decision making, statistical analysis, and business intelligence tools
- **Student Engagement:** Successfully engaged 100+ graduate students across diverse learning modalities with emphasis on practical applications
- **Curriculum Innovation:** Integrated real-world case studies and industry-relevant projects to bridge academic theory with practical business applications
- **Assessment Excellence:** Developed comprehensive evaluation frameworks ensuring both theoretical understanding and practical skill development

Bachelors in Computer Science

2021 - 2022

Bina Nusantara University

- **Calculus I (2021):** Foundation mathematical concepts for computer science applications with emphasis on problem-solving methodologies
- **Discrete Mathematics (2021-2022):** Advanced mathematical structures essential for computer science including logic, set theory, and combinatorics
- **Student Success:** Taught 80+ undergraduate students with focus on building strong mathematical foundations for advanced computer science concepts
- **Interactive Learning:** Implemented collaborative learning approaches and practical problem-solving sessions to enhance student comprehension

Academic Event Moderation

2020 - 2021

International Guest Lecturer Series

- **Event Leadership:** Successfully moderated 4 international academic events with participants from multiple universities in Indonesia and abroad
- **Audience Diversity:** Engaged undergraduate, graduate, and doctorate students, as well as faculty members from diverse academic backgrounds
- **Knowledge Facilitation:** Coordinated guest lecturer presentations and facilitated cross-institutional academic discussions
- **International Outreach:** Promoted academic collaboration and knowledge exchange between domestic and international academic institutions

TECHNICAL SKILLS & RESEARCH COMPETENCIES

Programming & Development

Python R MATLAB Julia C++ SQL
LaTeX Git/GitHub Docker Linux/Unix

Machine Learning & AI

TensorFlow PyTorch scikit-learn Keras
NumPy Pandas SciPy Jupyter Matplotlib
Seaborn

Research Specializations

Federated Learning Multi-View Clustering
Privacy-Preserving ML Dimensionality Reduction
Statistical Modeling Optimization Theory
Algorithm Design Data Integration

Cloud & Infrastructure

AWS Google Cloud Azure Kubernetes
Apache Spark Hadoop MongoDB PostgreSQL

OPEN SOURCE SOFTWARE & TOOLS

Published Python Packages

PyPI Contributions: 2 packages
Research-to-production translation

GitHub Repositories: Active maintenance **Impact:**
Specialization: Multi-view clustering algorithms

mvkm-ed 1.1.0

PyPI Package

Multi-View Clustering Framework

- ▷ **PyPI Link:** <https://pypi.org/project/mvkm-ed/>
- ▷ **GitHub Repository:** <https://github.com/KristinaPo9/Fed-MVKM>
- ▷ **Implementation:** Advanced clustering algorithms combining Federated Multi-View K-Means Clustering (Fed-MVKM) and Rectified Gaussian Kernel Multi-View K-Means Clustering (MVKM-ED)
- ▷ **Innovation:** Privacy-preserving distributed learning framework for multi-view clustering with enhanced discriminative power of rectified Gaussian kernels
- ▷ **Applications:** Successfully tested on synthetic datasets and DHA (Depth-included Human Action) Dataset
- ▷ **Impact:** Enables researchers and practitioners to implement state-of-the-art federated clustering algorithms

gcomvkm 0.1.0

PyPI Package

Collaborative Multi-View Clustering

- ▷ **PyPI Link:** <https://pypi.org/project/gcomvkm/>
- ▷ **GitHub Repository:** <https://github.com/kristinapo9/G-CoMVKM>
- ▷ **Algorithm:** Python implementation of Globally Collaborative Multi-View k-Means clustering algorithm
- ▷ **Technical Features:** Integrates collaborative transfer learning framework with entropy-regularized feature-view reduction
- ▷ **Methodology:** Dynamic elimination of uninformative components while balancing local view importance and global consensus
- ▷ **Validation:** Thoroughly tested on synthetic data with robust performance metrics

SELECTED PUBLICATIONS & RESEARCH IMPACT

Publication Metrics

Total Citations: 2,800+ **h-index:** 7 **Journal Articles:** 15+ **Conference Papers:** 4
Impact Factor Journals: IEEE, Elsevier, MDPI

Federated Multi-View K-Means Clustering

IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2025

Impact Factor: 24.3 | Tier 1 Journal | Novel federated learning framework

Unsupervised k-means clustering algorithm

IEEE Access, Vol. 8, pp. 80716-80727, 2020

Citations: 2,450+ | Featured in IEEE Access Popular Documents | Open Access

A feature-reduction multi-view k-means clustering algorithm

IEEE Access, Vol. 7, pp. 114472-114486, 2019

Citations: 140+ | Novel dimensionality reduction approach | High impact

Collaborative feature-weighted multi-view fuzzy c-means clustering

Pattern Recognition, Elsevier, 2021

Citations: 70+ | Advanced soft clustering methodology

• [Complete Publication List on Google Scholar](#)

CERTIFICATIONS & PROFESSIONAL DEVELOPMENT

Machine Learning Specialization

October 2022

Coursera - Stanford University & DeepLearning.AI

- ▷ **Comprehensive Certification:** Completed comprehensive machine learning fundamentals and applications course series
- ▷ **Verification:** [Certificate Link](#)
- ▷ **Skills Enhanced:** Supervised learning, unsupervised learning, neural networks, and advanced machine learning systems

DeepLearning.AI TensorFlow Developer Specialization

November 2022

Coursera - DeepLearning.AI

- ▷ **Advanced Certification:** Specialized training in TensorFlow and deep learning implementation frameworks
- ▷ **Verification:** [Certificate Link](#)
- ▷ **Technical Expertise:** Computer vision, natural language processing, time series forecasting, and sequences modeling

PEER REVIEW & EDITORIAL SERVICE

Professional Service Summary

Journal Reviewer for: IEEE Access, Computer Methods and Programs in Biomedicine (Elsevier), Information Fusion (Elsevier), Applied Soft Computing (Elsevier), Mathematics (MDPI), Algorithms (MDPI), Applied Sciences (MDPI), Big data and cognitive computing (MDPI), Designs (MDPI), Electronics (MDPI), Future Internet (MDPI), IoT (MDPI) **Recognition:** MDPI Exceptional Reviewers List 2025 **Reviews Completed:** 20+ peer reviews

Peer Reviewer

2020 - Present

IEEE Access, Elsevier & MDPI Journals

- ▷ **IEEE Access:** Regular reviewer for machine learning, data science, and computational intelligence manuscripts
- ▷ **Computer methods and programs in biomedicine (Elsevier):** Regular reviewer for formal computing methods, and their application in biomedical research and medical practice, by illustration of fundamental principles in biomedical informatics research
- ▷ **Information Fusion (Elsevier):** Regular reviewer for studies on data fusion techniques and their applications
- ▷ **Applied Soft Computing (Elsevier):** Regular reviewer for research on soft computing methodologies and their applications
- ▷ **Algorithms (MDPI):** Regular reviewer for studies related to algorithms and their applications
- ▷ **Mathematics (MDPI):** Expert reviewer for applied mathematics and algorithmic optimization papers
- ▷ **Applied Sciences (MDPI):** Contributing to quality assurance in interdisciplinary research publications
- ▷ **Big data and cognitive computing (MDPI):** Regular reviewer for studies on big data and cognitive computing
- ▷ **Designs (MDPI):** Reviewer for design methodologies and applications in engineering and technology
- ▷ **Electronics (MDPI):** Reviewer for electronics and electrical engineering research
- ▷ **Future Internet (MDPI):** Reviewer for studies on internet technologies and applications
- ▷ **IoT (MDPI):** Reviewer for Internet of Things research and applications
- ▷ **Impact:** Contributed to the advancement of knowledge in machine learning, data science, and applied mathematics through rigorous peer review
- ▷ **Reviews Completed:** 40+ peer reviews across multiple journals
- ▷ **Editorial Service:** Actively participating in editorial processes to ensure high standards of academic publishing
- ▷ **Professional Development:** Engaging in continuous learning through exposure to cutting-edge research and methodologies
- ▷ **Collaboration:** Collaborating with international researchers and academics to enhance the quality of published work
- ▷ **Recognition:** Selected for MDPI Mathematics Exceptional Reviewers List 2025 for outstanding peer review contributions

AWARDS & PROFESSIONAL RECOGNITION

Mathematics Exceptional Reviewers List 2025

2025

MDPI Publishers

- ▷ Selected among top peer reviewers worldwide for outstanding contributions to mathematics journals
- ▷ Recognized for expertise in machine learning, applied mathematics, and data science publications

Featured Popular Document - IEEE Access

2020 - Present

IEEE

- ▷ Research paper featured as one of the most-read documents in IEEE Access journal
- ▷ Recognized for significant readership impact and contribution to machine learning field

Honorary Member

2020

The Phi Tau Phi Scholastic Honor Society of The Republic of China, CYCU, Taiwan

- ▷ Inducted into prestigious international scholastic honor society recognizing academic excellence
- ▷ Honored for outstanding academic achievements and scholarly contributions during doctoral studies

Japan Science and Technology Agency (JST) Scholarship

2018

Niigata University, Japan

- ▷ Recipient of competitive international research scholarship for academic exchange program
- ▷ Selected for excellence in applied mathematics and research potential in STEM fields

Japan Student Service Organization (JASSO) Scholarship

2017

Niigata University, Japan

- ▷ Awarded prestigious international student scholarship for academic merit
- ▷ Recognized for outstanding academic performance and research contributions

CYCU International Student Scholarship

2016

Chung Yuan Christian University, Taiwan

- Recipient of competitive international doctoral scholarship covering full tuition and living expenses
- Selected based on academic excellence and research proposal quality for Ph.D. program

LANGUAGES

English

Advanced Professional
(CEFR C1)

Bahasa Indonesia

Native
(CEFR C2)

Mandarin

Basic
(CEFR A1)

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