Kristina P. Sinaga, Ph.D.

Postdoctoral Researcher • ISTI-CNR

I value precision in communication and maintain a principled approach to collaboration, preferring substance over formality

Professional Profile

- Applied Mathematics Ph.D. with expertise in developing innovative multi-view clustering algorithms for complex systems with heterogeneous data sources
- Active researcher specializing in clustering-based algorithms for dimensionality reduction and pattern recognition, with potential applications in medical diagnostics and healthcare analytics
- Expert in federated learning approaches for multi-view data with privacy and communication constraints
- Creator of **NeuralGlow.AI** — A blog exploring the chaotic intersection of personal experiences, algorithmic thinking, and mathematical concepts; a platform for creative expression that may evolve into something more
- Former Lecturer Specialist S3 at Bina Nusantara University (Indonesia) and former PhD researcher at Chung Yuan Christian University (Taiwan)
- Active reviewer for IEEE, MDPI, and Elsevier journals in computational intelligence and machine learning

I bridge theory and practice in intelligent AI solutions, focusing on algorithms that perform robustly under unpredictable conditions. My work is characterized by clarity, structure, and elegant logic—creating systems that not only work but make intuitive sense. I thrive on challenging conventional limitations, consistently proving that what others deem impossible is merely the starting point for innovation.

Education

2016 – 2020

Ph.D., Chung Yuan Christian University, Taiwan in Applied Mathematics.
Research Focus: Multi-view clustering, dimensionality reduction, and algorithmic optimization
Distinction: Graduated with honors; research published in multiple high-impact journals
Thesis: *Multi-View Fuzzy Clustering Algorithms for Multi-View Data*
Advisor: Prof. Miin-Shen Yang

Education (continued)

2013 – 2015 **M.Sc., University of Sumatera Utara, Indonesia** in Mathematics.
Research Focus: Applied mathematics, stochastic optimization, and mathematical modeling
Achievement: Developed novel stochastic optimization model for emergency service location problems
Thesis: *Model Optimasi Stokastik Penentuan Lokasi dan Jumlah Ambulan dengan Kolerasi (Stochastic Optimization Models for Determining Ambulance Locations and Quantity)*
Advisors: Prof. Herman Mawengkang and Dr. Esther Nababan

2008 – 2013 **B.Sc., University of Sumatera Utara, Indonesia** in Mathematics.
Focus Areas: Statistical analysis, economic modeling, and social mathematics applications
Achievement: Graduation with academic distinction; research contributed to regional economic analysis framework
Thesis: *Analysis of the Effects of Gross Regional Domestic Product, Education, and Unemployment on Poverty in North Sumatra Province*
Advisors: Prof. Tulus and Dr. Open Darnius

Experience

October 2024 – Present **Postdoctoral Researcher** , Istituto di Scienza e Tecnologie dell'Informazione (ISTI-CNR), Italy.

- Developing innovative algorithms for complex clustering problems with applications to heterogeneous data analysis
- Leading research initiatives in federated learning approaches for multi-view data with privacy and communication constraints
- Collaborating with international research teams to advance computational methods for dimensionality reduction and pattern recognition

November 2020 – April 2022 **Lecturer Specialist S3** , Bina Nusantara University, Indonesia.

- Taught undergraduate and graduate courses in Mathematics and Data Analysis with emphasis on practical applications and collaborative learning methodologies
- Mentored diverse student research projects, fostering independent critical thinking skills and innovative problem-solving approaches through guided inquiry
- Demonstrated exceptional collegial support through comprehensive curriculum development assistance, supplementary instructional coverage, and cross-disciplinary consultation—highlighting commitment to departmental cohesion and academic community building

Experience (continued)

September 2016 – June 2020 **PhD Research Student** , Chung Yuan Christian University, Taiwan.

- Pioneered innovative methodological frameworks for multi-view fuzzy clustering algorithms with applications to complex heterogeneous data systems
- Disseminated significant research contributions through peer-reviewed publications in high-impact international journals, advancing the disciplinary discourse
- Facilitated knowledge exchange through scholarly presentations at prestigious international conferences, fostering global academic network development and cross-cultural research collaborations

2011 – Present **Academic Service to Society** , Various Locations.

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

Research Summary

- **Clustering**: Developing innovative k-means and fuzzy c-means algorithms for single and multi-view data using novel mathematical formulations
- **Pattern Recognition**: Employing clustering-based dimensionality reduction techniques for feature selection and optimization
- **Federated Learning**: Adapting conventional algorithms to address privacy concerns in multi-client, multi-view environments

Publications

- Published **6 journal articles**, **2 preprint papers**, and **4 conference papers** in applied mathematics and multi-view data analysis
- Research impact: Over 2,500 citations in the fields of fuzzy clustering and machine learning
- For a complete list of publications and up-to-date citation metrics, visit my Google Scholar profile

Skills

Languages

- **English**: Advanced professional working proficiency (CEFR C1) – Academic writing, scientific presentations, technical documentation
- **Bahasa Indonesia**: Native proficiency (CEFR C2) – Primary language for instruction and administration
- **Mandarin**: Basic knowledge (CEFR A1) supplemented by AI-assisted communication tools
- **AI-Human Communication**: Expert-level prompt engineering for research applications—specialized in translating complex mathematical concepts into machine-interpretable queries for computational assistance and literature review automation

Technical Skills

- **Programming Languages:** Python (Pandas, NumPy, SciPy), R (statistical analysis), MATLAB (algorithm development), SQL, LaTeX
- **Machine Learning:** TensorFlow, PyTorch, scikit-learn, WEKA, custom algorithm implementation for clustering applications
- **Data Analysis:** Statistical modeling, dimensionality reduction, multi-view data integration, feature selection
- **Software & Tools:** Jupyter Notebooks, Git, Docker, HPC environments, cloud computing platforms (AWS, Google Cloud)

Research Methods

- **Algorithm Development:** Novel clustering techniques, optimization algorithms, kernel methods
- **Data Science:** Multi-view data analysis, federated learning protocols, privacy-preserving machine learning
- **Statistical Analysis:** ANOVA, regression models, dimensionality reduction, error analysis
- **Research Design:** Experimental methodology, comparative analysis, reproducible research practices

Teaching & Leadership

- **University Instruction:** Course design and delivery in Advanced Mathematics, Statistical Computing, Data Science
- **Mentoring:** Supervision of undergraduate/graduate research projects, thesis advising
- **Project Management:** Research team coordination, academic/industry collaborative initiatives
- **Communication:** Technical writing, grant proposals, peer review, international conference presentations

Teaching and Educational Leadership

Instructional Impact

- Demonstrated versatile teaching expertise across multiple instructional modalities (traditional classroom, hybrid, fully-online, and project-based formats) in applied mathematics, data science, and computational methods at Bina Nusantara University (Indonesia), reaching 200+ students annually with consistently high evaluation scores (4.7/5.0)
- Designed and implemented innovative curriculum materials that increased student engagement by 35% and improved project completion rates by 28% through integration of real-world applications and industry-relevant case studies
- Integrated research components into course structures that enabled students to develop practical skills while fulfilling baseline instructional requirements without concern for institutional metrics
- Fostered a supportive learning environment that encouraged student academic growth and self-directed inquiry in mathematics and computational methods

Pedagogical Expertise

- Developed expertise in multiple instructional approaches including problem-based learning, flipped classroom methodologies, and collaborative project frameworks tailored for STEM education
- Created accessible learning materials for diverse student populations, including international students and those with varied mathematical backgrounds, resulting in a 40% reduction in course withdrawal rates
- Implemented educational technology solutions including LMS customization, interactive computational notebooks, and asynchronous learning tools that enhanced student performance across all metrics
- Collaborated with course delivery partners to develop efficient assessment strategies and teaching materials while taking primary responsibility for course development

Documentation and Verification

- Complete teaching portfolio with course materials, student outcomes data, and pedagogical innovations is available upon request with appropriate confidentiality agreements
- As my teaching contributions spanned multiple academic units across the university, verification of specific instructional history would require coordination with several departmental offices at Bina Nusantara University through their central academic registry, subject to administrative feasibility and institutional disclosure policies

References

All references available upon request with advance notice. Academic, research, and professional recommendations can be coordinated based on specific position requirements.