



Curriculum Vita
November 2025

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EDUCATION

Sofia University “Kl. Ohridsky” - School of Mathematics & Computer Science, Master of Science, 1983.

Sofia University “Kl. Ohridsky”- School of Mathematics & Computer Science, B.S., 1982.

National High School of Mathematics and Computer Science “Lubomir Chakalov”, 1976, preparatory school for Bulgaria’s CS and Math Olympic team and Olympic team hopefuls.

Doctor of Mathematics, Title: 3D object recognition through regularities, order and set of identification. Center of Mathematics, Computer Science & Mechanics-Bulgarian Academy of Sciences, Nation-wise recognized, 1993.

TEACHING EXPERIENCE

2004-Present, Professor, Dept. of Mathematics, East Texas A&M University, Commerce, USA

2001- 2004; Instructor, Dept. Mathematics & Statistics Northern Arizona University- USA.

1999 –2001, Associate Professor, Institute of Mechanics and Biomechanics- Bulgarian Academy of Sciences, Bulgaria.

1999-2000, Invited Professor, Department CVRM, Instituto Superior Tecnico, Lisbon, Portugal.

1995-1997, External Assistant Professor, Transport University, Sofia, Bulgaria.

1990, Research Fellow I degree, International Lab of Artificial Intelligence – Slovak Academy of Sciences, Bratislava, Slovakia.

1988-1990, External Assistant Professor Technical University Sofia, Bulgaria.

PUBLICATIONS

16 Peer Reviewed Journal Papers out of 29

1. Nita Ngozi Ezekwem and **Nikolay Metodiev Sirakov**, Image Distillation with Machine Learned Gradient of the Loss Function and the K-means Method, Mathematics journal MDPI, IF 2.2 Science Citation Index Expanded 2024, Q1 general Mathematics, Q2 Engineering, **Accepted for publication November 11, 2025.**
2. Singh, A., Ambalavanan, N., **Sirakov, N.M.** and Nakhmani, A., Iterative Data Distillation and Augmentation for Enhancing Deep Learning Performance with Limited Image Training Data. *IET Image Process, Wiley*, **IF-2.3**, Clarivate, 19:e70107. <https://doi.org/10.1049/ipr2.70107>, **2025**.
3. **Sirakov, N.M.**; Ngo, L.H. Automatic Image Distillation with Wavelet Transform and Modified Principal Component Analysis. *Electronics*, 14, 1357, **IF 2.6**, SCI Expanded 2024. <https://doi.org/10.3390/electronics14071357>, **2025.**
4. Igbanami, O., Sirakov, N.M. On the Usefulness of the Vector Field Singular Points Shapes for Classification. Springer Nature, Int. J. Applied and Computational Mathematics, 10, 52 (2024). <https://doi.org/10.1007/s40819-024-01679-8>, **2024.**
5. **Sirakov NM**, Bowden A. Image Databases with Features Augmented with Singular-Point Shapes to Enhance Machine Learning. *Electronics*, **IF 2.6**, *SCI Expanded* 2023, 13 (16) : 3150, **2024.** <https://doi.org/10.3390/electronics13163150>, **2024.**
6. **N.M. Sirakov**, A. Bowden, M. Chen, L.H. Ngo, M. Luong, Embedding vector field into image features to enhance classification, *J. of Computational and Applied Mathematics, Elsevier*, V. 441, **2024**, 115685, ISSN 0377-0427, **IF 2.4** 2022 JCR, <https://doi.org/10.1016/j.cam.2023.115685> <https://www.sciencedirect.com/science/article/pii/S0377042723006283>, **2024.**
7. **Nikolay Metodiev Sirakov**, Tahsin Shahnewaz, Arie Nakhmani, Training Data Augmentation with Data Distilled by the Principal Component Analysis. *Electronics*, **IF 2.6** *SCI Expanded* **2022**, 13(2), 282, <https://doi.org/10.3390/electronics13020282>, **2024.**
8. Pravinkumar G. Kandhare, Namasivayam Ambalavanan, Colm P. Travers, Waldemar A. Carlo, **Nikolay M. Sirakov**, Arie Nakhmani, Comparison metrics for multi-step prediction of rare events in vital sign signals, *Biomedical Signal Processing and Control, Elsevier*, **IF 5.1**, SCI, Volume 80, Part 2, 104371, ISSN 1746-8094, <https://doi.org/10.1016/j.bspc.2022.104371>, Available at SSRN: <https://ssrn.com/abstract=4040757>, **2023.**
9. Kandhare, P.G., Nakhmani, A. & Sirakov, N.M. Deep learning for location prediction on noisy trajectories. *Pattern Analysis and Applications, Springer*, **26**, 107–122 (2023). **IF 3.9**, **SCR 2022** <https://doi.org/10.1007/s10044-022-01095-y>, **2023.**
10. L. H. Ngo, **N. M. Sirakov**, M. Luong, E. Viennet and T. Le-Tien, "Image Classification Based on Sparse Representation in the Quaternion Wavelet Domain," in *IEEE Access*, **IF 3.367** **SCR 2020** vol. 10, pp. 31548-31560, doi:[10.1109/ACCESS.2022.315970](https://doi.org/10.1109/ACCESS.2022.315970), **2022.**

11. Ngo, L.H., Luong, M., **Sirakov, N.M.**, Viennet, E., Le-Tien T. Skin lesion image classification using sparse representation in quaternion wavelet domain. *Signal, Image and Video Processing - Springer*, IF. 2.3 SCR 2022, 16, 1721–1729, <https://doi.org/10.1007/s11760-021-02112-z> 2022.
12. Mutlu Akar, **Nikolay M. Sirakov**, Mutlu Mete, Clifford algebra multivectors and kernels for melanoma classification, *Mathematical Methods in the Applied Sciences*, Wiley & Sons, IF 2.3, 2020 SCR, Volume 45, Issue 7, pp. 4056–4068. <https://doi.org/10.1002/mma.8034> , 2022.
13. A. Bowden, **N.M. Sirakov**, Active Contour Directed by the Poisson Gradient Vector Field and Edge Tracking, *Journal of Mathematical Imaging and Vision – Springer*, IF 1.76, SCR 2020, 63:665–680, 2021 <https://rdcu.be/cflal> , 2021.
14. Astudillo, N.M., Bolman, R. & **Sirakov, N.M.** Classification with Stochastic Learning Methods and Convolutional Neural Networks. *Journal Springer Nature Computer Science*. 1, 119, <https://doi.org/10.1007/s42979-020-00126-x> , 2020.
15. Akar, M. & **Sirakov, N.M.**, Support Vector Machine Skin Lesion Classification in Clifford Algebra Subspaces, *Appl. Math* (2019) 64: 581. <https://doi.org/10.21136/AM.2019.0292-18>, *Springer-Institute of Mathematics- Czech Academy of Sciences*, IF 0.537, 2018 SCI expanded, <https://link.springer.com/article/10.21136/AM.2019.0292-18#citeas>, <https://rdcu.be/b7SgN> , 2019.
16. A. Bowden, N. **M. Sirakov**, Applications of The Euler – Lagrange Poisson Active Contour in Vector Fields, Overcoming Noise, and Line Integrals, *J. Dynamics of Continuous, Discrete and Impulsive Systems Series B: Appl. & Algorithms*, Watam Press, 23 (2016) 59-73, 2016.

9 Peer Reviewed Chapter of Books out of 56

1. Petrus-Nihi, E.F., Akther, R., **Sirakov, N.M.** Image Features and Image Dataset Augmentation for Skin Lesions Machine Learning Classification. In: Le Thi, H.A., Pham Dinh, T., Le, H.M. (eds) *Modelling, Computation and Optimization in Information Systems and Management Sciences*. MCO 2025. **Lecture Notes in Networks and Systems**, vol 1689, pp 350-361, **Springer**, Cham. https://doi.org/10.1007/978-3-032-08384-5_29. 2025.
2. Petrus-Nihi, E.F., **Sirakov, N.M.** Embedding a New Conjugate Gradient Vector Field to Augment Image Features and Enhance Machine Learning Classification. In: Kahraman, C., *et al.* *Intelligent and Fuzzy Systems*. INFUS 2025. **Lecture Notes in Networks and Systems**, vol 1530. **Springer**, Cham. https://doi.org/10.1007/978-3-031-98565-2_11. 2025.
3. A. Singh, N. Ambalavanan, N. M. Sirakov and A. Nakhmani, "Adaptive Data Augmentation: Elliptical Masking and Dynamic Regularization with Feedback," *Southeast Con 2025*, Concord, NC, USA, 2025, pp. 427-432, published by **IEEE XPlore**. doi: <https://doi.org/10.1109/SoutheastCon56624.2025.10971474> . 2025.
4. Igbananmi, O., Sirakov, N.M., Bowden, A. (2024). CNN for Efficient Objects Classification with Embedded Vector Fields. In: García Márquez, F.P., Jamil, A., Ramirez, I.S., Eken, S., Hameed, A.A. (eds) *Computing, Internet of Things and Data Analytics. ICCIDA 2023. Studies in Computational Intelligence*, Springer, vol 1145. https://doi.org/10.1007/978-3-031-53717-2_29. 2024. **BEST PEPAR AWARD**
5. M. Mete, **N. M. Sirakov**, G. A. Hosler, J. Frieder, L. Dickson, J. Griffin, A. Menter, A Quarternary Classifier for the Clinical Evaluation of Pigmented Skin Lesions, 20th IEEE

- BIBE (Bioinformatic and Bioengineering) 2020, *published by IEEE Xplore*, 16 December 2020. DOI: [10.1109/BIBE50027.2020.00125](https://doi.org/10.1109/BIBE50027.2020.00125), 2020 .
6. P. G. Kandhare, A. Nakhmani, **N. M. Sirakov**, Trajectory Type Prediction and Multi-Target Tracking, IEEE SoutheastCon 2019, At the Von Braun Center in Huntsville, Alabama, April 11-14, 2019, published by *IEEE Xplore*, pp.1-6. 2019.
 7. M. Chen, **N. M. Sirakov**, Poisson Equation Solution and its Gradient Vector Field to Geometric Features Detection, *D. Fagan et al. (Eds.): TPNC 2018, Lecture Notes in Computer Science 11324, Springer Nature*, pp. 36–48, 2018, https://doi.org/10.1007/978-3-030-04070-3_3, 2018.
 8. L. H. Ngo, M. Luong, **N. M. Sirakov**, T. Le-Tien, S. Guerif, E. Viennet, Sparse Representation Wavelet Based Classification, ICIP2018, October 7-10, 2018 • Athens, Greece, *IEEE Xplore*, pp. 2974-2978, DOI: [10.1109/ICIP.2018.8451538](https://doi.org/10.1109/ICIP.2018.8451538), 2018.
 9. **N. M. Sirakov**, N. N. Sirakova, Inscribing Convex Polygons in Star-Shaped Objects, *V.E. Brimkov and R.P. Barneva (Eds.): IWCIA 2017, LNCS 10256, Springer International Publishing AG 2017*, pp. 198-211, 2017. DOI: 10.1007/978-3-319-59108-7_16, ISBN 978-3-319-59107-0, 2017.

RESEARCH GRANTS AND AWARDS

Funded Research Grants

- 2024-2025, Title:** Sub-Award: Vital Signs in Opioid-Exposed Neonates – ViSION, **Prime Sponsor:** National Institute of Health (NIH), **Pass-through Sponsor:** The University of Alabama at Birmingham, **PI** Dr. *Namasivayam Ambalavanan*, UAB Medical School, **ETAMU PI:** Dr. Nikolay M. Sirakov, **Amount Awarded:** \$10,000.00 .
- 2023-2025. Title:** Theoretical and Application Driven Mathematics (TADM), **PI** Dr. P Seneviratne, **Summer 2024, Senior Personal**, 3 undergraduate students, **Title:** Linear Combinations of Vector Fields and their Applications to Machine Learning, **NSF-REU**, ~ \$ 20,2000 .
- 2020-2021; 2022- 2023, Title:** Design of Vector Fields (VFs) with real and complex singularities. Embedding VFs into image databases to enhance Machine Learning. Two GAR grants funded by the President of **Texas A&M University Commerce**, ~\$50,000.
- 10.15.2018-10.14.2019, Title:** Application of Clifford Algebra in Skin Lesion Diagnosis, funded the research of Dr. Mutlu Akar with me at Texas A&M University Commerce, **TUBITAK**, \$30,000 .
- Summer 2019, Title:** Clasification d’images par transformée en ondelettes quaternioniques et les algèbres de Clifford – Application à la classification d’images de lésions de peau et à la détection automatique de mélanome, research at Sorbonne Univ. Paris 13, Paris France, **Sorbonne Univ. Paris 13**, ~\$7,000 .
- 2010-2011, Title:** Delineation of Skin Cancer and Lesions by Filters Supported Active Contour, Research Enhancement Program, **PI** N.M. Sirakov, **TAMUC**, \$14,533.

Awards:

1. **2023, Best Paper Award** - Igbasanmi, O., Sirakov, N.M., Bowden, A. (2024). CNN for Efficient Objects Classification with Embedded Vector Fields. In: García Márquez, F.P., Jamil, A., Ramirez, I.S., Eken, S., Hameed, A.A. (eds) *Computing, Internet of Things and Data Analytics. ICCIDA 2023. Studies in Computational Intelligence, Springer*, vol 1145. https://doi.org/10.1007/978-3-031-53717-2_29.
2. **2018, 2nd PLACE WINNER IN MATHEMATICS. Title:** An Artificial Intelligence Based Driving Environment Descriptor: Voice Alerts to Drivers, 15th TAMU System Pathway Students Symposium, Nov. 01st, 2018, West A&M U, Elisha Shachar, **Supervisor** N.M. Sirakov
3. **2017, 1st PLACE WINNER IN MATHEMATICS, Title:** Singular Points of the Gradient Field of the Poisson Partial Differential Equation Solution on an Image, TAMU System Pathway Students Symposium, Nov. 03, 2017, Tarleton State University, **talk** Master Student Mengzhe Chen, supervisor **Nikolay Sirakov**,
4. **2017, 3RD PLACE WINNER IN MATHEMATICS, Title:** Automatic Detection of Moving Targets in Video, TAMU System Pathway Students Symposium, Nov. 03, 2017, Tarleton State University, **talk** Tsitsi Msabaeka, co-authors Janessa Beach, Laura Beene, Supervisor: **Nikolay M. Sirakov**
5. **2015, Rajesh Shanmuga Sundaram** – my research student received first prize at **lion's innovation showcase** event November 21, **2015**.
6. **2015, Recipient of the TAMU Research, Scholarship, and Creative Activities– “Unfettered Thought” 2015;**
7. **2013, Lockheed Martin Best Paper Award** on the Automatic Targets Recognition-SPIE Defense Security and Sensing paper:
Arslan, Abdullah N., Christian F. Hempelmann, Carlo Di Ferrante, Salvatore Attardo, and Nikolay Metodiev Sirakov. 2013. "From Shape to Threat: Exploiting the Convergence Between Visual and Conceptual Organization for Weapon Identification and Threat Assessment." Invited Paper. Recipient of the Lockheed-Martin Best Paper Award. In: Sadjadi, Firooz A. and Abhijit Mahalanobis. Eds. Automatic Target Recognition XXIII. Proceedings of SPIE 0277-768X, V. 8744. Bellingham, WA: SPIE. 87440P. pp. 1-15. doi: 10.1117/12.2015591.
8. **2011, Texas A&M System Teaching Excellence Award.**
9. **2010, Texas A&M System Teaching Excellence Award.**