Stanislav V. Panev

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Professional Summary

Research Scientist & Investigator with 15+ years of experience in **Computer Vision** and **Machine Learning**. Expert in developing vision systems based on **Foundational Generative Models** and **Vision-Language Models (VLMs)** for complex scene understanding, adversarial robustness, and synthetic data generation. Proven track record of securing and leading high-impact research projects funded by international agencies, industry leaders, like **General Motors**, **Sony Corp.**, and the **U.S. Government** (Department of Defense). Supervised by **Professors Fernando De la Torre** (CMU), **Jessica Hodgins** (CMU), and **Shayok Chakraborty** (FSU). Extensive experience mentoring PhD and MSc students at **Carnegie Mellon University**.

Research Interests

computer vision; aerial and satellite imagery analysis;
foundation vision-language models and generative AI; adversarial robustness;
synthetic data generation for machine learning; computer graphics;

Academic Experience

Project Scientist 02/2018 – present

Robotics Institute, Carnegie Mellon University (Pittsburgh, PA, USA)

- Lead research on various aerial-view object detection and human activity recognition projects, including camouflage adversarial attacks, model diagnosis (explainable AI), domain adaptation. They involved producing synthetic datasets using foundational generative models or computer graphics. Contributor to a project for WIFI-based human pose-estimation.
- Investigator on DoD-funded projects.
- Mentor MSc and PhD students; contribute to scientific publications (e.g., ICCV, ECCV, WACV, ICIP)

Postdoctoral Fellow 08/2016 – 01/2018

Robotics Institute, Carnegie Mellon University (Pittsburgh, PA, USA)

- Investigator on Sony Corp. funded research related to human affective state estimation using wearable sensors. Contributor to Parkinson's Disease tremor detection project.
- Contribute to scientific publications in MDPI Sensors, ACM CHASE, EMBC.

Fulbright Visiting Research Scholar 08/2015 – 07/2016
Robotics Institute, Carnegie Mellon University (Pittsburgh, PA, USA)
- Investigator on General Motors funded research related to developing ADAS for automatic curb detection.
- Contribute to scientific journal publication on IEEE Translations on Intelligent Transportation Systems

Research Scientist 2014 – 2015
Technical University of Sofia (Sofia, Bulgaria)

Internship – European Union Program "Erasmus+" 2007 (4 months)
Public University of Navarre (Pamplona, Spain)

Education

PhD, Electrical Engineering and Computer Sciences 2008 – 2014
Technical University of Sofia (Bulgaria)

MSc, Electrical Engineering and Computer Sciences 2005 – 2008
Technical University of Sofia (Bulgaria)

BSc, Electrical Engineering and Computer Sciences 2001 – 2005
Technical University of Sofia (Bulgaria)

Awards and Honors

Outstanding reviewer, WACV 2024 2024
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)

Fulbright Visiting Scholar Program Grantee 08/2015 – 07/2016
Carnegie Mellon University (Pittsburgh, PA, USA)

Projects and Roles

"Cooperative Foundational Models for Object Detection Active Learning"
Sponsored by DEVCOM Army Research Laboratory (ARL) 2026 – present
U.S. Department of War (DoW)
Investigator

"Aerial-view Object Detector Diagnosis Using Foundational Image Generative Models"
DEVCOM Army Research Laboratory (ARL) 2024 – 2025
U.S. Department of Defense (DoD)
Investigator

"Realistic Vehicle Camouflage Adversarial Attacks With Latent Diffusion Generative Models" 2024 – 2025
DEVCOM Army Research Laboratory (ARL)
U.S. Department of Defense (DoD)
Investigator

"Counter Autonomy by Applying Adversarial Attacks on Satellite Imagery"
DEVCOM Army Research Laboratory (ARL) 2022 – 2023
U.S. Department of Defense (DoD)
Investigator

"Human Activity Recognition in Aerial Videos using Synthetic Data" 2021 – 2022
Army AI Innovations Institute (A2I2)
DEVCOM Army Research Laboratory (ARL)
U.S. Department of Defense
Investigator

"G2 – Satellite Vehicles Detection using Synthetically-generated Data" 2020 – 2021
U.S. Department of Defense
Investigator

Project "Maven" 2018 – 2020
U.S. Department of Defense
Investigator

"Affective State Estimation using Wearable Sensors" 2016 – 2019
Sony Corp., Japan
Investigator

"Monitoring Motor Symptoms in Parkinson's Disease with Wearable Devices" 2016
Carnegie Mellon University and AbiliLife Inc.
Investigator

"Automated Image Analysis for Robust Detection of Curbs" 2015 – 2016
General Motors Inc.
Investigator

Funded by the European Commission

Grant Nr. FP7-ICT-2013-10 2013 – 2016
"eWall for Active Long Living" (eWALL)
7th Framework Program
Investigator

Grant Nr. SIP-2008-TP-131801 2009 – 2011
"Forensic Image and Video Examination Support" (FIVES)
"Safer Internet Plus" Program
Investigator

Funded by the Bulgarian Science Fund at the Ministry of Education and Science of Bulgaria

"3D Face recognition: methods and algorithms with improved reliability and efficiency" 2010 – 2014
Grant DNTS/Slovenia 01/8
Bilateral contract between Bulgaria and Slovenia
Investigator

"Biometrical identification in video surveillance systems" 2008 – 2011
Grant Nr. DO02-41/2008
Bilateral contract between Bulgaria and Ukraine
Investigator

Funded by the Research and Development Sector at the Technical University of Sofia, Bulgaria

"Intelligent interface *human-computer by gaze tracking"* 2010 – 2011
Grant Nr. 102Ni168-7
Investigator

"Detection, extraction *and recognition of printed text from images"* 2009
Grant Nr. 091Ni114-07
Investigator

Conference Publications (selected)

[1] M. Yeghiazaryan, S. A. S. Namburu, E. Kim, **S. Panev**, C. de Melo, F. D. la Torre, and J. Hodgins, "Texture- and Shape-Based Adversarial Attacks for Overhead Image Vehicle Detection," in *2025 IEEE International Conference on Image Processing (ICIP)*, Sep. 2025, pp. 2133–2138.

[2] Z. Qin, **S. Panev**, C. de Melo, S. Chakraborty, J. Hodgins, and F. D. la Torre, "Leveraging generative AI for cross-regional small object detection in satellite imagery," in *Synthetic Data for Artificial Intelligence and Machine Learning: Tools, Techniques, and Applications III*, SPIE, May 2025, pp. 270–280.

[3] X. Fang, M. Jeon, Z. Qin, **S. Panev**, C. de Melo, S. Hu, S. Chakraborty, and F. D. la Torre, "Adapting Vehicle Detectors for Aerial Imagery to Unseen Domains with Weak Supervision," in *IEEE/CVF International Conference on Computer Vision (ICCV)*, 2025, pp. 8088-8099.

[4] **S. Panev**, E. Kim, S. A. S. Namburu, D. Nikolova, C. de Melo, F. D. la Torre, and J. Hodgins, "Exploring the Impact of Rendering Method and Motion Quality on Model Performance When Using Multi-View Synthetic Data for Action Recognition," in *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2024, pp. 4592–4602.

[5] F. Wang, S. Zhou, **S. Panev**, J. Han, and D. Huang, "Person-in-WiFi: Fine-Grained Person Perception Using WiFi," in *IEEE/CVF International Conference on Computer Vision (ICCV)*, 2019, pp. 5452–5461.

[6] A. Zhang, R. San-Segundo, **S. Panev**, G. Tabor, K. Stebbins, A. Whitford, F. D. la Torre, and J. Hodgins, "Automated tremor detection in Parkinson's disease using accelerometer signals," in *Proceedings of the 2018 IEEE/ACM International Conference on Connected Health: Applications, Systems and Engineering Technologies*, in CHASE '18. New York, NY, USA: Association for Computing Machinery, Jan. 2018, pp. 13–14.

[7] A. Zhang, A. Cebulla, **S. Panev**, J. Hodgins, and F. De la Torre, "Weakly-supervised learning for Parkinson's Disease tremor detection," in *2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Jul. 2017, pp. 143–147.

[8] **S. Panev** and A. Manolova, "Improved multi-camera 3D Eye Tracking for human-computer interface," in *2015 IEEE 8th International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications (IDAACS)*, Sep. 2015, pp. 276–281.

[9] A. Manolova, **S. Panev**, and K. Tonchev, "Human Gaze Tracking With An Active Multi-Camera System," in *Biometric Authentication*, V. Cantoni, D. Dimov, and M. Tistarelli, Eds., Cham: Springer International Publishing, 2014, pp. 176–188.

[10] **S. Panev**, P. Petrov, O. Boumbarov, and K. Tonchev, "Human gaze tracking in 3D space with an active multi-camera system," in *2013 IEEE 7th International Conference on Intelligent Data Acquisition and Advanced Computing Systems (IDAACS)*, Sep. 2013, pp. 419–424.

[11] O. Boumbarov, **S. Panev**, I. Paliy, P. Petrov, and L. Dimitrov, "Homography-based face orientation determination from a fixed monocular camera," in *Proceedings of the 6th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems*, Sep. 2011, pp. 399–403.

[12] Y. Kurylyak, F. Lamonaca, G. Mirabelli, O. Boumbarov, and **S. Panev**, "The infrared camera-based system to evaluate the human sleepiness," in *2011 IEEE International Symposium on Medical Measurements and Applications*, May 2011, pp. 253–256.

[13] O. Boumbarov, **S. Panev**, S. Sokolov, and V. Kanchev, "IR based pupil

tracking using optimized particle filter," in *2009 IEEE International Workshop on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications*, Sep. 2009, pp. 404–408.

Journal Publications

[1] R. San-Segundo, A. Zhang, A. Cebulla, **S. Panev**, G. Tabor, K. Stebbins, R. E. Massa, A. Whitford, F. D. la Torre, and J. Hodgins, "Parkinson's Disease Tremor Detection in the Wild Using Wearable Accelerometers," in *Sensors*, vol. 20, no. 20, p. 5817, Jan. 2020.

[2] **S. Panev**, F. Vicente, F. De la Torre, and V. Prinet, "Road Curb Detection and Localization With Monocular Forward-View Vehicle Camera," *IEEE Transactions on Intelligent Transportation Systems*, vol. 20, no. 9, pp. 3568–3584, Sep. 2019.

Conference Reviewer

IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**):
2020, 2021, 2022, 2023, 2024, 2025, 2026

IEEE/CVF International Conference on Computer Vision (**ICCV**):
2021, 2023, 2025

European Conference on Computer Vision (**ECCV**):
2026

IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**)
2021, 2024, 2025

Journal Reviewer

IEEE Transactions on Intelligent Transportation Systems (**T-ITS**):
2018, 2019, 2020

Invited Talks

"Human Activity Recognition Using Synthetic Data" 05/17/2024
Fulbright Scholar Series
Scientific Caribbean Foundation, Inc.
Partners of the Americas Puerto Rico Chapter, Americas Honduras Chapter, and Americas UNICA Chapter [*Online*]

"Introduction to Time Series" Workshop 06/10/2021
COVID-19 Hackaton at the University of Washington [*Online*]

"Human Face Analysis And Understanding With Computer Vision" 11/2015
Fulbright Visiting Scholar Series
Universidad Metropolitana, Universidad del Este and Universidad del Turabo
Puerto Rico

Students Mentorship

Xiao Fang — 2024 – 2026
MSc Student at Human Sensing Lab, CMU

Minhyek Jeon — 2024 – 2026
MSc Student at Human Sensing Lab, CMU

Zheyang Qin — 2025
MSc Student at Human Sensing Lab, CMU

Mikael Yeghiazaryan — 2023 – 2025
Research Assistant at Human Sensing Lab, CMU

Siddhartha Namburu — 2023 – 2024
MSc Student at Human Sensing Lab, CMU

Desislava Nikolova — 2024
Fulbright Visiting Scholar From TU Sofia, CMU

Emily Kim — 2023 – 2025
PhD Student advised by Prof. Jessica Hodgins, CMU

Deepthi Manjunatha Hegde — 2017
Robotics Institute Summer Scholars (RISS) Intern, CMU

Undergraduate Student Thesis Advising

Nikolay Svetoslavov Simeonov — 2012
Title: *"Key-points detection in consecutive video frames"*
Technical University of Sofia

Kiril Stefanov Stefanov — 2011
Title: *"Locating human eye in gray-scale images"*
Technical University of Sofia

Nikola Petrov Goranov — 2010
Title: *"Automated shot detection in video sequences"*
Technical University of Sofia

Zhenya Sashova Zhelyazkova — 2009
Title: *"Scenes and shot boundaries detection in videos"*
Technical University of Sofia

Zhasmina Nikolaeva Yordanova — 2009
Title: *"Human eye contour parameters estimation by the means of Particle filter and Mean-Shift"*
Technical University of Sofia

Skills

Languages: *Python, C/C++, MATLAB*
Frameworks: *PyTorch, HF Transformers, HF Diffusers, APIs OpenAI/Gemini*
Tools: *Linux/Unix, Git, Bash*

Languages

Bulgarian *(Native)*, English *(Fluent)*