Shane Grant

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Principal Scientist, engineering leader, and systems architect with 15+ years of experience in autonomous systems, neural networks, and high-fidelity simulation. Delivered scalable algorithms and infrastructure that boost operational efficiency, enhance customer outcomes, and bridge cutting-edge research with production-ready systems. Skilled at building and leading multidisciplinary teams, leveraging data-driven insights, and balancing long-term strategy with day-to-day execution.

EXPERIENCE

inVia Robotics   Feb 2018 - Sep 2025

as Principal Scientist (2025), Staff Scientist (2024), Senior Scientist (2022), Scientist (2018)
- Invented scalable multi-agent path planning and task assignment algorithms coordinating the movement and interaction of hundreds of robots across multiple deployments, doubling system performance.
- Led architecture through deployment of cloud/edge microservice framework to manage robot tasks and actions, including overhaul of on-robot navigation, communication, and state management, enabling 24/7 operation.
- Designed and productized customer-facing digital twin platform, providing end-to-end simulations of warehouse flow utilizing the full software stack from applications to robotic execution. Reduced quoting and design cycles from weeks to days. Empowered customers to independently model, predict, and verify operational changes without impacting production, offloading significant effort from internal teams.
- Granted 6 patents in autonomous warehouse robotics and execution systems.

as Warehouse Flow Lead (2022), Robotic Management System Lead (2019)
- Built and led multidisciplinary research and engineering teams across robot management and warehouse flow, establishing a department-wide interview and recruiting framework to scale talent.
- Spearheaded kaizen continuous improvement across engineering, operations, and sales, leading to multiple process enhancements including the adoption of a monthly release cadence with phased customer rollouts.
- Designed and maintained cross-customer performance dashboards in Grafana, analyzing operational metrics to identify bottlenecks, prioritize improvements, and guide strategic decision-making.
- Collaborated with enterprise customers and internal product teams to gather requirements and iteratively refine simulation tooling, ensuring alignment with operational needs.
- Represented inVia Robotics as technical expert in customer calls, on-site visits, and industry events, helping close sales deals including Fortune 500 accounts.

USC iLab | *Research Assistant*   Jan 2011 - Dec 2017
- Completed PhD thesis on modulatory feedback in neural networks, developing a cortex-inspired framework to minimize ambiguity with a novel unsupervised 'conflict learning' rule, as exemplified by its ability to model border ownership.
- Developed a state-of-the-art SLAM system for real-time, plane-based mapping using rotating LIDAR sensors for the DARPA Robotics Challenge.
- Created a point cloud library for the Neuromorphic Robotics Toolkit, a ROS-like modular framework for distributed computation.

SKILLS

Programming C++, Python, C, SIMD, PostgreSQL (incl. ltree, PLPYTHON3U), Lua, MATLAB, JavaScript, Bash

Libraries & Frameworks Django, OpenCV, NumPy, TBB, OpenMP, PyTorch, RPC/serialization

Tools & Infrastructure Docker, Linux, Nginx, TCP/UDP, redis, InfluxDB, Grafana, Git, CI/CD, Jira, Confluence, Ansible

Expertise multi-agent path planning, neural networks, computer vision, SLAM, simulation

EDUCATION

University of Southern California | *PhD, Computer Science*   **2017**

UC San Diego | *BS, Computer Engineering*   **2010**

ADDITIONAL EXPERIENCE

Skybox Imaging | *Imaging Intern*   Jun - Aug 2012
- Computer vision and geo-spatial development, satellite image super resolution, aerial cloud simulation, and SIMD code optimization.

The Scripps Research Institute | *Software Engineer*   Jun - Sep 2009
- Extracted and corrected imagery from raw video to match onboard sensor data. Ported legacy MATLAB code to C++.

Microsoft | *SDET Intern*   Jun - Sep 2008
- Implemented test fixtures in C, C++, and AppleScript for Mac Office applications and databases.

NBC Universal | *Intern*   Jun - Aug 2007
- Learned wing-to-wing decision making and workflows while shadowing leadership in Digital Services, Digital Delivery, and New Business Development.

PROJECTS

cereal | *github.com/USCiLab/cereal*   2013 - Present
- Co-creator, lead developer, and maintainer of widely used modern C++ serialization library.

Triumph Spitfire Restoration Project   2015 - 2021
- Completely disassembled and rebuilt every component while refurbishing a 1974 Triumph Spitfire. Designed and fabricated custom wiring harness and daytime-running-light circuit.

UCSD Unmanned Aerial Systems Team   2006 - 2010
- Led software systems while co-managing team, using CUDA to accelerate vision algorithms and achieve a 2nd place result in the AUVSI international competition focused on autonomous flight and target recognition.

PUBLICATIONS

Grant, W Shane and Laurent Itti (2019). "Learning Invariant Features in Modulatory Networks through Conflict and Ambiguity". In: *Neural Computation* 31, pp. 344–387.

Grant, W Shane, Randolph C Voorhies, and Laurent Itti (2019). "Efficient velodyne SLAM with point and plane features". In: *Autonomous Robots* 43, pp. 1207–1224.

Grant, W Shane, James Tanner, and Laurent Itti (2017). "Biologically plausible learning in neural networks with modulatory feedback". In: *Neural Networks* 88, pp. 32–48.

Grant, W Shane, Randolph C Voorhies, and Laurent Itti (2013). "Finding planes in LiDAR point clouds for real-time registration". In: *Intelligent Robots and Systems (IROS), 2013 IEEE/RSJ International Conference on.* IEEE, pp. 4347–4354.

Grant, W Shane and Laurent Itti (2012). "Saliency mapping enhanced by symmetry from local phase". In: *Image Processing (ICIP), 2012 19th IEEE International Conference on.* IEEE, pp. 653–656.

SELECTED PATENTS

Grant, William Shane Simpson, Joseph Traverso, et al. (2025). "Parallelized and modular planning systems and methods for orchestrated control of different actors". U.S. Patent 12,367,438.

Grant, William Shane Simpson, Randolph Charles Voorhies, et al. (2021). "Spatiotemporal robotic navigation". U.S. Patent 11,099,576.