

Scott Kulp, Ph.D.

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Education

- 2008 – 2015 ■ **Ph.D. in Computer Science, Rutgers University**
- 2005 – 2008 ■ **B.S. in Computer Science and Mathematics, Ursinus College, Summa cum Laude**











Employment History

- 2021 – ■ **Principal Computational Scientist**, Climate Central, Princeton, NJ
- 2017 – 2021 ■ **Senior Computational Scientist**, Climate Central, Princeton, NJ
- 2015 – 2017 ■ **Computational Scientist and Senior Developer**, Climate Central, Princeton, NJ
- 2013 – 2015 ■ **Senior Developer and Research Associate**, Climate Central, Princeton, NJ
 - Conduct and supervise scientific programming, and co-author peer-reviewed research.
 - **FloodVision** [!\[\]\(f2fdbbba686c1099e6b2b8779766e2d3_img.jpg\)](#)
 - Conceived, designed, and lead development of Climate Central’s FloodVision program, where we use machine learning to generate photorealistic and scientifically accurate visualizations of coastal flood projections within street-level photos.
 - Collect terabytes of data weekly from multiple vehicle-top sensors, which are integrated with AI systems to generate flood imagery and assess elevations of features within the video.
 - Prototyped first working system that synchronized and collected data from multiple cameras, a lidar sensor, and a high-precision GPS receiver.
 - **CoastalDEM** [!\[\]\(b3cfbfd04368a71f4c64e073908d25d7_img.jpg\)](#)
 - Independently conceived of, designed, and implemented CoastalDEM - a global high accuracy digital elevation model.
 - CoastalDEM uses machine learning technology to virtually eliminate elevation bias and reduce error of other, older elevation models.
 - **Coastal Vulnerability Analysis System**
 - Lead development of coastal analysis systems, used to assess flooding risks and vulnerability across the US and globally.
 - Using Dask to process terabytes of data across hundreds of processors in parallel on Amazon AWS.
- 2010 – 2014 ■ **Graduate Research Assistant**, Rutgers University, Piscataway, NJ
 - Completed Ph.D. under Dimitris Metaxas, working on a project to simulate blood flow through the heart.
 - Utilized CT scans of healthy and abnormal hearts to generate precise 3D meshes, including detailed trabeculae, and conducted high-resolution fluid simulations using these heart models as boundary conditions.
 - Built custom software to perform SPH fluid simulations on a GPU using NVIDIA CUDA.






Employment History (continued)

- 2008 – 2011  **Computer Science Intern**, Department of Defense, Fort Meade, MD (Summers Only)
- Spent first two summers in human language technology lab working on a number of projects related to information retrieval, topic clustering, supervised machine learning, and high-dimensional data visualizations.
 - Spent Summer 2010 in biometrics lab starting a project to simulate the deformation of iris tissue due to pupil dilation in order to improve iris recognition performance.
 - Spent Summer 2011 in multimedia processing lab on a project to implement both regular and convolutional neural networks in NVIDIA CUDA in order to accelerate training times on a GPU.

Research Publications

- 1 M. E. Hauer, S. A. Jacobs, and S. A. Kulp, “Climate migration amplifies demographic change and population aging,” *Proceedings of the National Academy of Sciences*, vol. 121, no. 3, e2206192119, Jan. 2024, ISSN: 0027-8424.  DOI: 10.1073/pnas.2206192119.
- 2 S. Kulp and B. H. Strauss, “CoastalDEM v3.0: Improving fully global coastal elevation predictions through a convolutional neural network and multi-source DEM fusion,” Climate Central, Tech. Rep., 2024.  URL: <https://go.climatecentral.org/coastaldem>.
- 3 L. J. Cushing, Y. Ju, S. Kulp, *et al.*, “Toxic Tides and Environmental Injustice: Social Vulnerability to Sea Level Rise and Flooding of Hazardous Sites in Coastal California,” *Environmental Science & Technology*, vol. 57, no. 19, pp. 7370–7381, May 2023, ISSN: 0013-936X.  DOI: 10.1021/acs.est.2c07481.
- 4 M. K. Buchanan, S. Kulp, and B. Strauss, “Resilience of U.S. coastal wetlands to accelerating sea level rise,” *Environmental Research Communications*, vol. 4, no. 6, p. 061 001, Jun. 2022, ISSN: 2515-7620.  DOI: 10.1088/2515-7620/ac6eef.
- 5 D. J. Rasmussen, S. Kulp, R. E. Kopp, M. Oppenheimer, and B. H. Strauss, “Popular extreme sea level metrics can better communicate impacts,” *Climatic Change*, vol. 170, no. 3-4, p. 30, Feb. 2022, ISSN: 0165-0009.  DOI: 10.1007/s10584-021-03288-6.
- 6 A. R. Bell, D. J. Wrathall, V. Mueller, *et al.*, “Migration towards Bangladesh coastlines projected to increase with sea-level rise through 2100,” *Environmental Research Letters*, vol. 16, no. 2, p. 024 045, Feb. 2021, ISSN: 1748-9326.  DOI: 10.1088/1748-9326/abdc5b.
- 7 S. A. Kulp and B. H. Strauss, “CoastalDEM v2.1: A high-accuracy and high-resolution global coastal elevation model trained on ICESat-2 satellite lidar,” Climate Central, Tech. Rep., 2021.  URL: <https://go.climatecentral.org/coastaldem/clkn/https/www.climatecentral.org/coastaldem-v2.1>.
- 8 Z. S. Siegel and S. A. Kulp, “Superimposing height-controllable and animated flood surfaces into street-level photographs for risk communication,” *Weather and Climate Extremes*, vol. 32, p. 100 311, Jun. 2021, ISSN: 2212-0947.  DOI: 10.1016/J.WACE.2021.100311.
- 9 B. H. Strauss, S. A. Kulp, D. J. Rasmussen, and A. Levermann, “Unprecedented threats to cities from multi-century sea level rise,” *Environmental Research Letters*, vol. 16, no. 11, p. 114 015, Nov. 2021, ISSN: 1748-9326.  DOI: 10.1088/1748-9326/ac2e6b.
- 10 B. H. Strauss, P. M. Orton, K. Bittermann, *et al.*, “Economic damages from Hurricane Sandy attributable to sea level rise caused by anthropogenic climate change,” *Nature Communications*, vol. 12, no. 1, p. 2720, May 2021, ISSN: 2041-1723.  DOI: 10.1038/s41467-021-22838-1.
- 11 G. Bove, A. Becker, B. Sweeney, M. Vousdoukas, and S. Kulp, “A method for regional estimation of climate change exposure of coastal infrastructure: Case of USVI and the influence of digital elevation

- models on assessments,” *Science of The Total Environment*, vol. 710, p. 136 162, Mar. 2020, ISSN: 0048-9697. [DOI: 10.1016/J.SCITOTENV.2019.136162](https://doi.org/10.1016/J.SCITOTENV.2019.136162).
- 12 G. Bove, A. Becker, B. Sweeney, M. Vousdoukas, and S. Kulp, “A method for regional estimation of climate change exposure of coastal infrastructure: Case of USVI and the influence of digital elevation models on assessments,” *Science of The Total Environment*, vol. 710, p. 136 162, Mar. 2020, ISSN: 0048-9697. [DOI: 10.1016/J.SCITOTENV.2019.136162](https://doi.org/10.1016/J.SCITOTENV.2019.136162).
 - 13 M. K. Buchanan, S. Kulp, L. Cushing, R. Morello-Frosch, T. Nedwick, and B. Strauss, “Sea level rise and coastal flooding threaten affordable housing,” *Environmental Research Letters*, vol. 15, no. 12, p. 124 020, Nov. 2020, ISSN: 1748-9326. [DOI: 10.1088/1748-9326/abb266](https://doi.org/10.1088/1748-9326/abb266).
 - 14 S. A. Kulp and B. H. Strauss, “New elevation data triple estimates of global vulnerability to sea-level rise and coastal flooding,” *Nature Communications*, vol. 10, no. 1, p. 4844, Dec. 2019, ISSN: 2041-1723. [DOI: 10.1038/s41467-019-12808-z](https://doi.org/10.1038/s41467-019-12808-z).
 - 15 R. B. Noland, S. Wang, S. Kulp, and B. H. Strauss, “Employment accessibility and rising seas,” *Transportation Research Part D: Transport and Environment*, vol. 77, pp. 560–572, Dec. 2019, ISSN: 1361-9209. [DOI: 10.1016/J.TRD.2019.09.017](https://doi.org/10.1016/J.TRD.2019.09.017).
 - 16 D. J. Wrathall, V. Mueller, P. U. Clark, *et al.*, “Meeting the looming policy challenge of sea-level change and human migration,” *Nature Climate Change*, vol. 9, no. 12, pp. 898–901, Dec. 2019, ISSN: 1758-678X. [DOI: 10.1038/s41558-019-0640-4](https://doi.org/10.1038/s41558-019-0640-4).
 - 17 K. Desmet, R. Kopp, S. Kulp, *et al.*, “Evaluating the Economic Cost of Coastal Flooding,” National Bureau of Economic Research, Cambridge, MA, Tech. Rep., Aug. 2018. [DOI: 10.3386/w24918](https://doi.org/10.3386/w24918).
 - 18 S. A. Kulp and B. H. Strauss, “CoastalDEM: A global coastal digital elevation model improved from SRTM using a neural network,” *Remote Sensing of Environment*, vol. 206, pp. 231–239, Mar. 2018, ISSN: 0034-4257. [DOI: 10.1016/J.RSE.2017.12.026](https://doi.org/10.1016/J.RSE.2017.12.026).
 - 19 D. J. Rasmussen, K. Bittermann, M. K. Buchanan, *et al.*, “Extreme sea level implications of 1.5 C, 2.0 C, and 2.5 C temperature stabilization targets in the 21st and 22nd centuries,” *Environmental Research Letters*, vol. 13, no. 3, Mar. 2018, ISSN: 1748-9326. [DOI: 10.1088/1748-9326/aaac87](https://doi.org/10.1088/1748-9326/aaac87).
 - 20 R. E. Kopp, R. M. DeConto, D. A. Bader, *et al.*, “Evolving Understanding of Antarctic Ice-Sheet Physics and Ambiguity in Probabilistic Sea-Level Projections,” *Earth’s Future*, vol. 5, no. 12, pp. 1217–1233, Dec. 2017, ISSN: 23284277. [DOI: 10.1002/2017EF000663](https://doi.org/10.1002/2017EF000663).
 - 21 S. Kulp and B. H. Strauss, “Rapid escalation of coastal flood exposure in US municipalities from sea level rise,” *Climatic Change*, vol. 142, no. 3-4, pp. 477–489, Jun. 2017, ISSN: 0165-0009. [DOI: 10.1007/s10584-017-1963-7](https://doi.org/10.1007/s10584-017-1963-7).
 - 22 S. Kulp and B. H. Strauss, “Global DEM Errors Underpredict Coastal Vulnerability to Sea Level Rise and Flooding,” *Frontiers in Earth Science*, vol. 4, Apr. 2016, ISSN: 2296-6463. [DOI: 10.3389/feart.2016.00036](https://doi.org/10.3389/feart.2016.00036).
 - 23 B. H. Strauss, S. Kulp, and A. Levermann, “Carbon choices determine US cities committed to futures below sea level,” *Proceedings of the National Academy of Sciences of the United States of America*, 2015, ISSN: 1091-6490. [DOI: 10.1073/pnas.1511186112](https://doi.org/10.1073/pnas.1511186112).
 - 24 B. H. Strauss, S. Kulp, and A. Levermann, “Mapping Choices: Carbon, Climate, and Rising Seas — Our Global Legacy,” Climate Central, Tech. Rep., 2015. [URL: http://sealevel.climatecentral.org/research/reports/mapping-choices-carbon-climate-and-rising-seas-our-global-legacy](http://sealevel.climatecentral.org/research/reports/mapping-choices-carbon-climate-and-rising-seas-our-global-legacy).
 - 25 S. Kulp, Z. Qian, M. Vannan, S. Rinehart, and D. Metaxas, “Patient-specific aortic valve blood flow simulations,” in *2014 IEEE 11th International Symposium on Biomedical Imaging (ISBI)*, IEEE, Apr. 2014, pp. 939–942, ISBN: 978-1-4673-1961-4. [DOI: 10.1109/ISBI.2014.6868026](https://doi.org/10.1109/ISBI.2014.6868026).

- 26 D. Metaxas, S. Kulp, M. Gao, S. Zhang, Z. Qian, and L. Axel, "Segmentation and Blood Flow Simulations of Patient-Specific Heart Data," in *Computational Surgery and Dual Training*, New York, NY: Springer New York, 2014, pp. 213–240, ISBN: 978-1-4614-8648-0.  DOI: 10.1007/978-1-4614-8648-0_14.
- 27 A. D. Clark, S. A. Kulp, I. H. Herron, and A. A. Ross, "A Theoretical Model for Describing Iris Dynamics," in *Handbook of Iris Recognition*, London: Springer London, 2013, pp. 129–150, ISBN: 978-1-4471-4402-1.  DOI: 10.1007/978-1-4471-4402-1_7.
- 28 S. Kulp, M. Gao, S. Zhang, *et al.*, "Practical patient-specific cardiac blood flow simulations using SPH," in *2013 IEEE 10th International Symposium on Biomedical Imaging*, IEEE, Apr. 2013, pp. 832–835, ISBN: 978-1-4673-6455-3.  DOI: 10.1109/ISBI.2013.6556604.
- 29 S. Kulp, M. Gao, S. Zhang, *et al.*, "Using High Resolution Cardiac CT Data to Model and Visualize Patient-Specific Interactions between Trabeculae and Blood Flow," in Springer, Berlin, Heidelberg, 2011, pp. 468–475, ISBN: 978-3-642-23623-5.  DOI: 10.1007/978-3-642-23623-5_59.
- 30 S. Kulp, D. Metaxas, Z. Qian, S. Voros, L. Axel, and V. Mihalef, "Patient-specific modeling and visualization of blood flow through the heart," in *2011 IEEE International Symposium on Biomedical Imaging: From Nano to Macro*, IEEE, Mar. 2011, pp. 1692–1697, ISBN: 978-1-4244-4127-3.  DOI: 10.1109/ISBI.2011.5872730.