Roman Kowch

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EDUCATION

Massachusetts Institute of Technology (Cambridge, MA)

- M.S. in Atmospheric Science — Sep 2012 – Sep 2013
  - Thesis: Diurnal analysis of intensity trends in Atlantic tropical cyclones
  - Adviser: Prof. Kerry Emanuel
  - Focus: Tropical cyclones, meteorology, observational data, statistics.
  - Graduate GPA: 4.7 / 5.0

- B.S. in Earth, Atmospheric, and Planetary Sciences — Sep 2008 – Jun 2012
  - Double major in Physics.
  - Focus: Fluid dynamics, blocking patterns, computational physics.
  - Cumulative GPA: 4.4 / 5.0

WORK EXPERIENCE

Science Systems and Applications, Inc.

NASA Langley Research Center (Hampton, VA)

- Systems Programmer / Analyst, CALIPSO Mission — Jun 2014 – Present
  - Supervisors: Patricia Lucker (SSAI Group Manager) and Dr. Chip Trepte (CALIPSO Project Scientist)
  - Subject Matter Expert under the Science, Technology and Research Support Services (STARSS) contract specializing in atmospheric dynamics, satellite and modeled data processing, parallel programming and visualization.
  - Developed extensive visualization tools for displaying remote sensing data with disparate geometries and resolutions (e.g. CALIPSO vs. MODIS data), using Google Earth and ParaView as rendering engines, and applying original programming techniques. Have applied these tools to support analyses of output-data algorithms, with projects covering lidar and camera reflectance analysis, sub-pixel cloud detection, and comparisons between averaged geostationary imagery and radiative fluxes.
  - Routinely organized visualization prototypes under a version-control system for access and modification by other colleagues.
  - Served as spaceborne satellite coordinator for 2019 NASA Camp^{2}Ex field mission by designing visualizations of predicted overpasses to aid flight planning and data collection related to satellite calibration and validation. My products and verbal collaborations allowed team to consider 10-20 satellites days in advance and evaluate options based on meteorological conditions.
  - Thoroughly designed a Matlab GUI for operating Langley's lidar simulator, by passing input parameters through windows, editing upper-level scripts, and formatting output data as HDF. The simulator is being upgraded to meet study requirements in NASA's newest Aerosol, Clouds, Convection and Precipitation (A+CCP) observation strategy.
  - Delivered oral/poster presentations at science team meetings on the motivation, data inputs, design, and underlying meteorology of 3-D output displays containing NASA satellite imagery.
  - Mentored interns from various STEM disciplines for 3 seasonal terms, with projects focused on interfacing data ingest and visualization output, and lidar statistical analyses.
  - Contributed to outreach events by choreographing and generating big-data displays of satellite imagery on NASA Hyperwall at professional meetings and Langley Centennial, and communicating technical aspects of CALIPSO data products to other NASA centers.
  - Programming Languages: Matlab, C/C++, Python, Linux Bash, Perl, Windows Batch, Fortran.
  - File Formats: HDF, NetCDF, KML, Shapefile, McIDAS AREA, GRIB.
  - Software: Linux utilities, Portable Batch System (PBS), Matlab Compiler, ParaView, Google Earth, FFmpeg, ImageMagick, MS Office, Git.
  - Focus: Big-data visualization & animation, simulated lidar data, geostationary satellite composites, lidar science, satellite retrieval, data analytics.

PROFESSIONAL WORKS

PUBLICATIONS

[3] Kar, J., M. A. Vaughan, Z. Liu, A. H. Omar, C. R. Trepte, J. Tackett, T. D. Fairlie, and R. Kowch, 2015: "Detection of pollution outflow from Mexico City using CALIPSO lidar measurements." *Remote Sens. Environ.*, **169**, 205–211, doi:10.1016/j.rse.2015.08.009

[2] Kowch, R., 2015: "A 3-D Look at Weather, Clouds, and Aerosols." *NASA Scientific Visualization Studio*, https://svs.gsfc.nasa.gov/4377. Accessed 3 May 2019.

[1] Kowch, R. and K. Emanuel, 2015: "Are Special Processes at Work in the Rapid Intensification of Tropical Cyclones?" *Mon. Wea. Rev.*, **143**, 878–882, doi:10.1175/MWR-D-14-00360.1

ORALS / POSTERS

[8] Soja, A., "Dynamic Global Fire Connections." Provided technical graphics on 2018 Camp Fire for NASA Hyperwall Talk, AGU Fall Meeting 2018, Dec 2018.

[7] Bedka, K., D. Spangenberg, R. Palikonda, W. Smith Jr., L. Nguyen, <u>R. Kowch</u>, "McIDAS Activities at NASA Langley Research Center." Described methods of collocating CALIPSO/CloudSat cross-sections with geostationary image animations from McIDAS for analysis, May 2018.

[6] <u>Kowch, R.</u>, "Expanding Context of CALIPSO/CloudSat Observations through Global and Mesoscale Visualizations of Supplementary Data." Poster Presentation at 2018 CALIPSO/CloudSat Science Team Meeting, Apr 2018.

[5] <u>Kowch, R.</u>, C. Trepte, and P. Lucker, "3-D Visual Analysis of African Convection impacting Saharan Dust Transport using A-Train Imagery, Animated Geostationary Imagery, and Modeled Trajectories." Poster Presentation at 2017 A-Train Symposium, Apr 2017.

[4] Trepte, C. and <u>R. Kowch</u>, "Fusing Atmospheric Observations and Model Output for Global 4-D Visualizations with Google Earth." Langley Atmospheric Science Data Center (ASDC) Plenary Session 2016, Jan 2016.

[3] <u>Kowch, R.</u>, "CALIPSO at 10 Years." Created high-resolution movie of CALIPSO, CloudSat and geostationary satellite data and delivered NASA Hyperwall Talk at AMS Annual Meeting 2016, Jan 2016.

[2] <u>Kowch, R.</u>, "Combining Data-intensive Atmospheric Observations and Model Output for Global 4-D Visualization in Google Earth." Oral Presentation at AGU Fall Meeting 2015, Dec 2015.

[1] <u>Kowch, R.</u>, "Global Visualization of Earth Science Data from Satellites." Oral Presentation to Virginia State Dignitaries visiting SSAI, Nov 2015.

AWARDS & SCHOLARSHIPS

- Performance Award — Dec 2018
  Science Systems and Applications, Inc. (SSAI)
  For outstanding contributions to a rapid response request from NASA to provide CALIPSO/CloudSat imagery for the NASA Disasters Program.

- Cover Image Selection for BAMS, Vol 99, No 3 — Mar 2018
  American Meteorological Society (AMS)
  For visually communicating the synergy of CALIPSO and CloudSat observations on sampling the vertical structure of clouds and aerosols. Selection criteria found <u>here</u>.

- Certificate of Acknowledgment — Sep 2017
  NASA Internships and Fellowships (NIFS) Program
  For excellence in mentorship over 2 terms. Student: Britney Hopgood.

- Performance Award — Sep 2016
  Science Systems and Applications, Inc. (SSAI)
  In recognition for providing sound guidance and patient support as a NASA Mentor. Student: Pedro Pena (U. Miami).

- Performance Award — Dec 2015
  Science Systems and Applications, Inc. (SSAI)
  For outstanding support in ensuring that the Hampton VIP Day on Nov. 5, 2015 was a great success.

- Ernest F. Hollings Undergraduate Scholarship — 2010 – 2012
  National Oceanic and Atmospheric Administration (NOAA)
  Academic assistance and guaranteed internship for promising college students in the atmospheric, oceanic, and related sciences. Achieved 2nd place poster award.

- Weather Forecasting trophy winner in Freshman/Sophomore category — 2010
  WxChallenge collegiate competition

- AMS Freshman Scholarship — 2008 – 2009
  American Meteorological Society (AMS)

- James R. Hoffa Memorial Scholarship — 2008 – 2009
  International Brotherhood of Teamsters

- Sam Walton Community Scholarship — 2008 – 2009
  Walmart Inc.

PROFESSIONAL AFFILIATIONS	**American Geophysical Union**, Washington, DC, USA	
	▪ Member	2015 – Present
	American Meteorological Society, Boston, MA, USA	
	▪ Member	2012 – Present