



## Timothy J. Schmit

[tims@ssec.wisc.edu](mailto:tims@ssec.wisc.edu) or [tjschmit@wisc.edu](mailto:tjschmit@wisc.edu)

<http://cimss.ssec.wisc.edu/~tims/>

Tim Schmit has been at the forefront of making critical satellite data available to users since NOAA launched the Geostationary Operational Environmental Satellite (GOES) I Series in 1994. Tim has been a leader in defining the mission requirements for the GOES imagers, which resulted in enhanced capability to detect, track, and monitor severe weather. Tim has spent his career ensuring the quality of the visible and infrared imagery produced from GOES data, so that forecasters can accurately analyze and display the imagery and derived products. Tim played a key role in the post-launch checkouts of GOES-8 through -19, 1994-2024, by ensuring high quality images and data are available to users.

## Professional Positions

### Meteorologist

University of Wisconsin-Madison, Madison, WI, 1996 - present. (Honorary Fellow)

NOAA/NESDIS, Madison, WI, 1996 - December 31, 2024. (Meteorologist)

Tim Schmit worked in the Sensors and Calibration Branch within NOAA's NESDIS Center for Satellite Applications and Research (STAR) located in Madison, WI (the 'birthplace of satellite meteorology').

Satellite data and processing, including calibration, simulations and algorithms for processing satellite data into meteorological/environmental information and has a lead role in the band selection for the Advanced Baseline Imager (ABI) on next generation GOES-R series and the applications associated with advanced geostationary sounders.

Extensive experience with data and deriving products from the current GOES imager and sounder data. Involved in the check-out of GOES-8 thru 15 and co-led the science check-outs of

GOES-13/14/15. Supported the move of GOES-10 and GOES-12 to 60 degrees for operation over the Southern Hemisphere. In general, Tim acted as the 'defacto' legacy GOES scientist.

GOES-R series: from how to meet requirements, data distribution, calibration, ABI band selection, sounder trade-off studies, simulating the imagery, and modifying data from existing research satellites as proxy data sets, downlink, calibration, re-broadcast, distribution, archive/access, visualization, product generation, education, out-reach, validations and applications. Applications include imagery and soundings (e.g., TPW, etc.), worked to make GOES ABI to routinely capture full disk imagery every 10 minutes.

Supported the GOES-17 Loop Heat Pipe issue (monitoring, new timeline -- which is now used over four periods over the year to provide cooler detector temperatures by taking less images, etc.)

Tim has been a science lead for the Advanced Baseline Imager (ABI) on the GOES-R series (GOES-16/17/18 and 19).

Past member of the GEO Extended Orbits working group for next generation instruments, included an advanced geostationary infrared sounder.

### **Assistant Researcher**

CIMSS, Madison, WI, June 1991 – April 1996.

Extensive computer work with product development, testing, verification and implementation for geostationary weather satellite products. Products include atmospheric profiles and several derived meteorological parameters.

Facilitated and monitored the transfer of research products into the operational realm in Washington DC.

GOES calibration -- GOES-7, GOES-8 and GOES-9 (imager and sounder).

Wrote or co-authored several publications. Presented at many conferences.

Designed and oversaw several derived products on the CIMSS home page.

Worked with NWS personal at Sullivan (WI) and Salt Lake City (UT) to showcase new satellite products.

Project Manager for the GOES Pathfinder Demonstration Data Set on CD-ROM.

### **Senior Research Specialist**

CIMSS, Madison, WI, June 1989 – June 1991.

Simulate information which will come from the next generation geostationary imager and sounder. From simulated data, calculate satellite products for a variety of instrument noise scenarios. Communicated conclusions through memorandums, presentations and a poster.

Compare and report on operational infrared satellite winds. Transfer software to personnel in satellite operations in Washington DC.

Process daily time series of VAS average radiance near the north pole.

Compute radiometric noise statistics for current satellites.

Archive data for 3 field experiments: Pacific typhoons, Brazilian rain forest fires and satellite intercomparisons.

### **Research Specialist**

CIMSS, Madison, WI, June 1987 – June 1989.

Calculate satellite water vapor and wind fields over Amazonia and Process satellite-derived rainfall over Brazil.

Initial case for simulation of next generation satellite radiance fields.

Investigate various calibration issues for the next generation geostationary weather satellite.

Monitor operational set-up of VAS satellite sounder retrievals on the VDUC mainframe computer near Washington, DC.

### **Project Assistant**

CIMSS, Madison, WI, January 1987 – May 1987.

Archive various satellite data for field experiment over Brazil and Monitor real-time operational satellite products.

### **Research Assistant**

SSEC, Madison, WI, August 1985 – December 1986.

Research for Master's degree: The Moisture Budget over the Arabian Sea during an Active Monsoon

## **Education**

**M.S.**, Meteorology. University of Wisconsin-Madison, 1987. Thesis: "The Moisture Budget over the Arabian Sea during an Active Monsoon".

**B.S.**, Meteorology. University of Wisconsin-Madison, 1985.

Physics and Mathematics concentration. St. John's University (MN), 1981-1983.

## **Professional Memberships and Activities**

### **Current Memberships**

American Meteorological Society (AMS) member

Co-editor for satellites for the Bulletin of the AMS

Co-chair of the AMS Future / New Generation Satellite Symposium

National Weather Association (NWA) member

## **Media**

Numerous media engagements, including provided imagery to many media outlets such as, the program *Years of Living Dangerously*, *Outside Magazine*, *Wireless*, the *Weather Channel* and the NFL show *Timelines*. Guest on the *Weather Geeks*, another many other shows, including a Big Ten Live football half-time video showcasing the GOES.

## **Awards**

2024: The GOES-R program special science award "for his tireless enthusiasm, dedication, and commitment to geostationary imagery, science, and applications".

2023: Part of a NASA Goddard Group award: GeoXO Program Science Working Groups.

2022: National Oceanic and Atmospheric Administration (NOAA) Bronze Medal, for Strategic Planning efforts.

2020: NOAA Administrator's award (with many others) for GOES-16/17 support.

2019: Elected to be an American Meteorological Society (AMS) Fellow.

2018: Finalist for the Samuel J. Heyman Service to America award.

2017: Received the NOAA Administrator's award for ABI GOES-16 beta stage completion

2017: NASA GOES-R Group Achievement Award for "...world's highest quality weather monitoring..."

2016: CIMSS animation contest: One of top three for best GOES animation, part of the 40th anniversary celebration.

2015: Certificate of Appreciation for "Exceptional Planning and Execution of the 2015 NOAA Satellite Conference.

2014: U.S. Department of Commerce Gold Medal for Scientific and Engineering Achievement, for "outstanding critical support extending the useful life of aging geostationary weather satellites, thereby greatly improving coverage over South America".

2013: U.S. Department of Commerce Silver Medal for Scientific and Engineering Achievement, for "their efforts in support of returning GOES-13 to operations after a major on-orbit anomaly that affected the spacecraft and the image and sounder instruments".

2013: Certificate of Appreciation for "Exceptional Planning and Execution of the 2013 NOAA Satellite Conference.

2012: Part of 7th GOES Users' Conference Support Team that received the GOES-R Outstanding Team award for 1QFY12

2011: U.S. Department of Commerce Silver Medal for Scientific and Engineering Achievement, for "revolutionizing the GOES post-launch tests".

2011: Recognized by the Spaceflight Meteorology Group for support over the years to the Space Shuttle Program for expertise on both GOES and GOES-R. (This included receiving a patch that had flown in space.)

2011: Received the T. Theodore Fujita Research Achievement Award from the National Weather Association (NWA). The citation read "for excellence in promoting and extending the use of satellite data within the operational community currently and in the future". This award is for research that has significantly contributed to the field of operational meteorology.

2010: Cash-in-your-account award for "outstanding efforts as Science and Mission Support Session Lead for the STAR External Review"

2009: National Oceanic and Atmospheric Administration (NOAA) Bronze Medal, for Strategic Planning efforts.

2008: NASA Group Achievement Award for GOES-N check-out.

2008: Cash-in-your-account award for "Exceptional work in preparing and providing a CDR for the AWG sounding products."

2007: National Oceanic and Atmospheric Administration (NOAA) Bronze Medal, for work related to data compression.

2007: NOAA Certificate regarding extended GOES High-Inclination (XGOHI) validations.

2004: Cash-in-your-account award for "help with the GOES-R Users' Conference"

2000: U.S. Department of Commerce Silver Medal for Scientific and Engineering Achievement, geostationary sounding work.

1999: National Oceanic and Atmospheric Administration (NOAA) Bronze Medal, regarding Distance Learning.

## **Research**

Interests: The complete range of GOES, from photons to product applications to users.

Some of Tim's GOES-R Imager activities include: helping to define the early NOAA TRD – Technical Requirements Documents, ABI band selection and definitions, ABI simulations using a myriad of satellite or simulated data and waiver request support. In fact, when Tim began working on the ABI, it only had 8 spectral bands, yet a long list of requirements.

Tim is the co-chair of both the Imagery and Visualizations and Soundings Algorithm Working Group (AWG) teams and has long been communicating the benefits of the ABI.

Tim is NOAA's product lead for the GeoXO Sounder (GXS) which is slated to be launched in 2035.

## **Advising**

Worked with a number of students, both at the under-graduate and masters level.

Taught at a number of AMS short courses, satellite "bookcamp" sessions, on-line ABI training and UW/AOS guest lecturer.

# Publications

*Summary: Author/co-author approximately 120 refereed papers (listed below), plus numerous conference proceedings papers, several book chapters, co-editor of a book and a variety of workshop papers and technical reports.*

## Reviewed Publications

Schmit T. J. and co-authors, 2025: GOES: Past, Present and Future. Book Chapter, Elsevier, in press.

Lindsey, Daniel T.; Heidinger, Andrew K.; Sullivan, Pamela C.; McCorkel, Joel; Schmit, Timothy J.; Tomlinson, Michelle; Vandermeulen, Ryan; Frost, Gregory J.; Kondragunta, Shobha; Rudlosky, Scott. GeoXO: NOAA's Future Geostationary Satellite System. Bulletin of the American Meteorological Society, Volume 105, Issue 3, 2024, E660-E679.

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Mosher, Frederick R.; Herbster, Christopher G.; Miller, Steven D.; Zuranski, Mike; Sirvatka, Paul; Kohrs, Richard A.; Hoese, David; Schmit, Timothy J.; Nelson, James P. and Haley, Robert. True-Color Imagery from GOES-A Synopsis of Past and Present. Journal of Operational Meteorology, Volume 11, Issue 4, 2023, pp.33-48.

Ma, Zheng; Li, Zhenglong; Li, Jun; Min, Min; Sun, Jianhua; Wei, Xiaocheng; Schmit, Timothy J. and Cucurull, Lidia. An enhanced storm warning and nowcasting model in pre-convection environments. Remote Sensing, Volume 15, Issue 10, 2023, pp.2672.

Li, Jun; Menzel, W. Paul; Schmit, Timothy J. and Schmetz, Johannes. Applications of geostationary hyperspectral infrared sounder observations: progress, challenges, and future perspectives. Bulletin of the American Meteorological Society, Volume 103, Issue 12, 2023, E2733-E2755..

Ayala, Anthony C. Bernal; Gerth, Jordan J.; Schmit, Timothy J.; Lindstrom, Scott S. and Nelson, James P., III. Parallax shift in GOES ABI data. Journal of Operational Meteorology, Volume 11, Issue 2, 2023, pp.14-23..

Miller, N. B.; Gunshor, M. M.; Merrelli, A. J.; L'Ecuyer, T. S.; Schmit, T. J.; Gerth, J. J. and Gordillo, N. J. Imaging considerations from a geostationary orbit using the short wavelength side of the mid-infrared water vapor absorption band. Earth and Space Science, Volume 9, Issue 1, 2022. Reprint # 8767.

Li, Jun; Zhang, Yurong; Di, Di; Ma, Zheng; Li, Zhenglong; Schmit, Timothy J. and Menzel, W. Paul. The influence of sub-footprint cloudiness on three-dimensional horizontal wind from geostationary hyperspectral infrared sounder observations. Geophysical Research Letters, Volume 49, Issue 11, 2022, e2022GL098460.

Li, Zhenglong; Ma, Zheng; Wang, Pei; Lim, Agnes H. N.; Li, Jun; Jung, James A.; Schmit, Timothy J. and Huang, Hung-Lung. An objective quality control of surface contamination observations for ABI water vapor radiance assimilation. Journal of Geophysical Research-Atmospheres, Volume 127, Issue 15, 2022, e2021JD036061.

Wang, Pei; Li, Zhenglong; Li, Jun and Schmit, Timothy J. Added-value of GEO-hyperspectral infrared radiances for local severe storm forecasts using the hybrid OSSE method. Advances in Atmospheric Physics, Volume 38, 2021, 1315-1333.

Ma, Zheng; Li, Zhenglong; Li, Jun; Schmit, Timothy J.; Cucurull, Lidia; Atlas, Robert and Sun, Bomin. Enhance low level temperature and moisture profiles through combining NUCAPS, ABI observations, and RTMA analysis. Earth and Space Science, Volume 8, Issue 6, 2021, e2020EA001402.

Ma, Zheng; Li, Jun; Han, Wei; Li, Zhengloung; Zeng, Qingcun; Menzel, W. Paul; Schmit, Timothy J.; Di, Di and Liu, Chian-Yi. Four-dimensional wind fields from geostationary Hyperspectral Infrared Sounder radiance measurements with high temporal resolution. *Geophysical Research Letters*, Volume 48, Issue 14, 2021.

Li, Zhengloung; Schmit, Timothy J.; Li, Jun; Gunshor, Mathew M. and Nagle, Frederick W. Understanding the imaging capability of tundra orbits compared to other orbits. *IEEE Transactions on Geoscience and Remote Sensing*, Volume 59, Issue 11, 2021, pp.8944-8956.

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Wang, Pei; Li, Jun and Schmit, Timothy J. The impact of low latency satellite sounder observations on local severe storm forecasts in regional NWP. *Sensors*, Volume 20, Issue 3, 2020, pp.650.

Li, Jinlong; Li, Jun; Velden, Christopher; Wang, Pei; Schmit, Timothy J. and Sippel, Jason. Impact of Rapid-Scan-Based Dynamical Information From GOES-16 on HWRF Hurricane Forecasts. *Journal of Geophysical Research-Atmospheres*, Volume 125, Issue 3, 2020, e2019JD031647.

Mathew M. Gunshor, Timothy J. Schmit, David Pogorzala, Scott Lindstrom, James P. Nelson, III, 2020: GOES-R Series ABI Imagery Artifacts, *JARS*. <https://doi.org/10.1117/1.JRS.14.032411>

Schmit, T., and M. Gunshor, Book Chapter on ABI Imagery for the GOES-R Book: The GOES-R Series: A New Generation of Geostationary Environmental Satellites, ISBN: 9780128143278, Elsevier

Li, J, J. Li and T. Schmit, Co-author on Book Chapter on Soundings for the GOES-R Book: The GOES-R Series: A New Generation of Geostationary Environmental Satellites, ISBN: 9780128143278, Elsevier

Li, Zhengloung, Jun Li, Mathew Gunshor, Szuchia Moeller, Timothy J. Schmit, Fangfang Yu, and Will McCarty, 2019: Homogenized water vapor absorption band radiances from international geostationary satellites, *Geophysical Research Letters*. <https://doi.org/10.1029/2019GL083639>

Wang, Pei; Li, Jun and Schmit, Timothy J. The impact of low latency satellite sounder observations on local severe storm forecasts in regional NWP. *Sensors*, Volume 20, Issue 3, 2020. <https://doi.org/10.3390/s20030650>

Schmit, T.J and co-authors, 2019: Legacy atmospheric profiles and derived products from GOES-16: validation and applications, *Earth and Space Science*. <https://doi.org/10.1029/2019EA000729>

Li, Zhengloung; Li, Jun; Schmit, Timothy J.; Wang, Pei; Lim, Agnes; Li Jinlong; Nagle, Fredrick W.; Bai, Wenguang; Otkin, Jason A.; Atlas, Robert; Hoffman, Ross N.; Boukabara, Sid-Ahmed; Zhu Tong; Blackwell, William J. and Pagano, Thomas S. The alternative of CubeSat-based advanced infrared and microwave sounders for high impact weather forecasting. *Atmospheric and Oceanic Science Letters*, Volume 12, Issue 2, 2019, pp.80-90.

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Miller, Steven D.; Schmit, Timothy; Seaman, Curtis J.; Lindsey, Daniel T.; Gunshor, Mathew M.; Kohrs, Richard A.; Sumida, Yasuhiko and Hillger, Donald. A sight for sore eyes: The return of true color to geostationary satellites. *Bulletin of the American Meteorological Society*, Volume 97, Issue 10, 2016, pp.1803-1816.

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Schmit, Timothy J.; Goodman, Steven J.; Gunshor, Mathew M.; Sieglaff, Justin; Heidinger, Andrew K.; Bachmeier, A. Scott; Lindstrom, Scott S.; Terborg, Amanda; Feltz, Joleen; Bah, Kaba; Rudlosky, Scott; Lindsey, Daniel T.; Rabin, Robert M. and Schmidt, Christopher C. Rapid refresh information of significant events: Preparing users for the next generation of geostationary operational satellites. *Bulletin of the American Meteorological Society*, Volume 96, Issue 4, 2015, 561-576, supplement.

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