

# Sarah M. Champion

*Data Architect | Atmospheric and Climate Science Research Scholar | Military Veteran | U.S. Citizen*

Formally trained Atmospheric and Climate Scientist, with 17 years of professional experience in providing quality science information through published research and major operational projects. Designed and led the implementation of a first-ever information quality enterprise for the U.S. National Climate Assessment (NCA). This enterprise has been deployed by three U.S. Federal agencies, the U.S. Global Change Research Program, and the Intergovernmental Panel on Climate Change, and serves as the benchmark for the transparency, accessibility, and reproducibility of federal government scientific information.

## Skills and Qualifications

Skills	Information architecture Process Improvement Data Analysis Strategic planning Project Management Public speaking and communication Collaboration Team building and leadership
Certifications	IBM Data Science (expected 2020) Climate Change Professional (expected 2020) Copyright Leadership (2019) Expert Witness Training Academy (2011)
Languages	ArcGIS UNIX Python MATLAB Perl C++
Professional Education	Program Improvement Foundations (2020) Program Management Foundations: Budgets (2020) Managing Temporary and Contract Employees (2020) Writing a Proposal (2020) Metrics for Program Managers (2020) Fighting Gender Bias at Work (2020) Federal Appropriations and Fiscal Law (2011) Federal Budget (2011) Federal Grants (2011) AMS Science Policy Colloquium (2011) Military Officership and Organizational Leadership (2003)

## Professional Experience

## Data Architect

NOAA's Technical Support Unit (TSU) for the National Climate Assessment (NCA)

North Carolina State University Cooperative Institute for Satellite Earth System Studies (CISESS)

North Carolina Cooperative Institute for Climate Studies (NCICS)

Asheville, NC

January 2014 - Present

In this role, I lead a multi-disciplinary/multi-agency team in the compliance with the Office of Management and Budget Information Quality Act for Highly Influential Scientific Assessments and the Foundations for Evidence-Based Policymaking Act of 2018, ensuring the accessibility and transparency of NCA data and information, and the reproducibility of NCA science. As of 2019, this work includes an inaugural partnership with NOAA General Counsel, which I initiated specifically to ensure full legal compliance on all mandates (e.g., FOIA, FISMA, Privacy, etc.).

- Pioneered the technical design and implementation of a first-ever NCA information quality stewardship process and suite of tools for collection, provenance, and accessibility of NCA data, metadata, data analysis and visualization methods, and tools; lauded as “the poster-child for information quality in the U.S. government”, for “being light years ahead of any other government agency” (Dr. Ed Kearns, *Department of Commerce Chief Data Officer*), and for “doing some of the most amazing metadata work I have ever seen” (Dr. Ted Habermann, *Metadata Game Changers*).
- Lead the integration of NCA metadata into the U.S. Global Change Research Program (USGCRP) [Global Change Information System](#) (GCIS), to include coordination of a complete back-end restructuring of associated dataset and activity models, resulting in complete NCA science, data and source metadata provenance for 1,526 figures and 175 datasets for nine U.S. government reports.
- Lead a technical team of web developers and software engineers in the modernization of TSU tools, migrating our data asset management system from a dual to a single software platform, eliminating multiple technical dependencies and incompatibilities between the Drupal and Meteor software databases.
- Spearheaded the design of TSU information and tools into the [NCICS website](#), creating the first-ever open digital access to the technical support details, contacts, and tools for the NCA.
- Orchestrated the course for modernizing NCA TSU web-services for data accessibility and visualization by designing the concept for an interactive web-based [metadata viewer](#) and data sandbox, providing cloud-based tools for accessing, understanding, and visualizing climate data and information. These tools are used by media, researchers, and industry to access and understand how to tailor assessment information for their uses.
- Expertly guided the successful implementation of NCA tools and processes into multiple federal agencies (Environmental Protection Agency, Department of Energy, NOAA) as well as the International Panel on Climate Change (IPCC), extending the model of information quality beyond the NCA.
- Invited speaker, trainer, and subject matter expert on U.S. government information quality requirements, management, and tools.

## Research Scholar

North Carolina State University Cooperative Institute for Satellite Earth System Studies (CISESS)

North Carolina Cooperative Institute for Climate Studies (NCICS)  
Asheville, NC

January 2014- Present

- Coordinator and co-author on the [North Carolina Climate Science Report](#) in response to Executive Order 80: North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy.
- Co-author and coordinator of the collaborative Climate Projection Engineering Weather Data (EWD) Pilot Study with the Department of Defense, providing 50-year climate projection information for Langley and Thule Air Force Bases to facilitate cost-savings determinations and understand local impacts of climate change.
- Led the completion of first-ever [NOAA State Climate Summaries](#), coordinating the production of five interwoven elements (text, figures, web, print, data/metadata) in describing state-specific historical and projected climate change parameters and associated impacts for all 50 U.S. states and territories. Served as contributing author for 34 out of 50 summaries.
- Contributing researcher for the *Strategic Environmental Research and Development Program (SERDP) Incorporation of the Effects of Future Anthropogenically-Forced Climate Change in Intensity-Duration-Frequency (IDF) Design Values*, with focused analysis on historical extreme precipitation events associated with frontal systems. Analysis aims to identify atmospheric triggers of these events for analysis of climate change impacts to these same parameters for future prediction, mitigation and adaptation of engineering values.
- Member of the Technical Support Unit Science Team, serving as a contributing author, providing data and climate analysis for inclusion in policy-driving climate assessment products.

### **Data Management Coordinator for the National Climate Assessment**

LMI, Inc.  
Asheville, NC

April 2013-December 2013

- Co-lead of multi-agency Data Management Interagency Taskforce, charged with defining policy documentation to support Assessment and agency use of the USGCRP GCIS. Co-authored requirements and policy documents in support of this effort.
- Led effort for first-ever complete metadata collection in support of the Third National Climate Assessment, resulting in an unprecedented and unanticipated 88% completion of NCA figure metadata with minimal resources.

### **Executive Officer**

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*STG, Inc., High Performance Technologies, Inc., The Baldwin Group*  
Asheville, NC

*April 2010-September 2012*

- Multi-hatted role comprising of Chief of Staff, agency liaison, and advisor to the Deputy Director and Acting Director of the former National Climatic Data Center, now National Centers for Environmental Information (NCEI), ensured compliance with all actions/requests of NCEI.
- Migrated center-wide process and tools to the cloud, resulting in a streamlined and electronic system for coordinating all associated communication with NCEI, National Environmental Satellite, Data, and Information Service (NESDIS), and Department of Commerce (DOC) staff.
- Re-structured communication models and facilitated the execution of executive-level meetings, to include sensitive information.

### **Senior Staff Technical Analyst/Liaison to Headquarters, Air Force Weather**

*Dynamics Research Corporation*  
The Pentagon, Washington, D.C.

*October 2009-April 2010*

- One of four liaisons to Headquarters Air Force Weather for the Department of Defense Air and Space Natural Environment Modeling and Simulation Executive Agent.
- Charged with planning, programming, research, development, and requirements management in an effort to develop data for the purposes of warfighting training and readiness.

### **U.S. Air Force Officer**

*Department of Defense*  
Shaw AFB, SC; Monterey, CA; Asheville, NC

*May 2003 – October 2009*

- (14<sup>th</sup> Weather Squadron) Flight Commander over 10-person flight, comprised of active duty and civilian personnel, charged with providing tailored weather information and climatological studies, in support of special operations forces, intelligence community, unified commands, field commanders, and major command planners.
  - Successfully transitioned long-range forecast research into operational tools used across the Department of Defense.
  - Responsible for performance ratings, budget considerations, direct supervision, priority setting, and overall management of staff and flight objectives.
- (Shaw AFB) Flight Commander over 24-person flight, comprised of civilian, contractor, Air National Guard, U.S. Marine Corps and Air Force active duty personnel.
  - Led flight in providing aircrew members, ground forces, mission planners, combat weather teams, command post, Combined Air Operations Center Officials, and

senior leaders around-the-clock weather information in support planning and executing combat operations throughout 4.6 million square mile United States Central Command area of responsibility, directly supporting Operations ENDURING FREEDOM and IRAQI FREEDOM.

- Responsible for schedules, performance evaluations, and direct supervision of all flight personnel.

## Education

North Carolina State University | Raleigh, NC

*Ph. D. – Atmospheric Science | Expected 2022*

Advisor: Dr. Kenneth E. Kunkel

Dissertation: *Anthropogenic Increases in Heavy Precipitation Associated with Frontal Systems: A Climatology*

The Naval Postgraduate School | Monterey, CA

*M. S. – Meteorology | 2007*

Advisors: Dr. Tom Murphree and Dr. Karl Pfeiffer

Thesis: *Long-range operational military forecasts for Afghanistan*

The Pennsylvania State University | University Park, PA

*B. S. – Meteorology | 2003*

## Professional Associations

The American Meteorological Society (AMS)

The American Geophysical Union (AGU)

Earth Science Information Partners (ESIP)

## Service and Leadership

Founder and Chair, *NCICS Employee Committee*

Volunteer, *Asheville Humane Society*

## Publications

### 2020

Kunkel, K.E., D.R. Easterling, T.R. Karl, J. Biard, **S. Champion**, S. Stegall, L. Stevens, S. Stevens, M. Squires, L. Sun, and X. Yin, 2020: Incorporation of the Effects of Future Anthropogenically Forced Climate Change in Intensity-Duration-Frequency Design Values: Final Report. North Carolina Institute for Climate Studies, North Carolina State University, 103 pp.

Kunkel, K.E., D.R. Easterling, A. Ballinger, S. Bililign, **S.M. Champion**, D.R. Corbett, K. Dello, J. Dissen, J. Kossin, G. Lackmann, R. Luettich, B. Perry, W. Robinson, L. Stevens, B. Stewart, and A. Terando, 2020: *North Carolina Climate Science Report*. North Carolina Institute for Climate Studies.

Dupigny-Giroux, L-A., A. Jay, K. Dow, D. Liverman, A. Lustig, W. Solecki, D. Reidmiller, C.W. Avery, B. Stewart, **S. Champion**, and J. Hernandez, 2020: The Fourth

National Climate Assessment and IPCC Special Report on Global Warming of 1.5C, State of the Science. Anthropocene, submitted.

## 2019

Kunkel, K. E., and **S. M. Champion**, 2019: An assessment of rainfall from Hurricanes Harvey and Florence relative to other extremely wet storms in the United States. *Geophysical Research Letters*, **46**, 13500-13506. <http://dx.doi.org/10.1029/2019GL085034>

## 2017

Kunkel, K., R. Frankson, J. Runkle, **S. Champion**, L. Stevens, D. Easterling, and B. Stewart, 2017: State Climate Summaries for the United States. NOAA Technical Report NESDIS 149, <http://stateclimatesummaries.globalchange.gov/>

Kunkel, K. E., **S. M. Champion**, L. Sun, and J. Rennie, 2017: Climate Model Data Support to the Assistant Secretary of Air Force (ASAF) Climate Projection Engineering Weather Data (EWD) Project. Final Report, Contract N61340-14-C-6103 P00013, 53 pp.

**Champion, S.M.**, contributing author for: Easterling, D.R., K.E. Kunkel, J.R. Arnold, T. Knutson, A.N. LeGrande, L.R. Leung, R.S. Vose, D.E. Waliser, and M.F. Wehner, 2017: Precipitation Change in the United States. In: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, D.C., USA, pp. 207-230, doi: 10.7930/J0H993CC.

## 2016

Kunkel, K.E., D.A. Robinson, **S. Champion**, X. Yin, T. Estilow, and R.M. Frankson, 2016: Trends and Extremes in Northern Hemisphere Snow Characteristics. *Current Climate Change Reports* 2, no. 2, 65-73.

Waple, A. M., **S. M. Champion**, K. E. Kunkel, and C. Tilmes, 2016: Innovations in information management and access for assessments. *Climatic Change*, **135**, 69-83. <http://dx.doi.org/10.1007/s10584-015-1588-7>

## Presentations

### 2020

**Champion, S. M.**, 2020: Information Quality and The National Climate Assessment. *Invited Talk*, 2020 Earth Science Information Partners (ESIP) Summer Meeting, Virtual, 22 July 2020.

**Champion, S.M.**, 2020: Information Quality and the National Climate Assessment. Federal Steering Committee for the Fifth National Climate Assessment. 23 June 2020.

**Champion, S. M.**, 2020: Quality Metadata and The National Climate Assessment. 2020 Earth Science Information Partners (ESIP) Winter Meeting, Bethesda, MD, 7 January 2020.

Kunkel, K. E., **Champion, S. M.**, Easterling, D. R., Dissen, J., Stewart, B. C., 2020: [NCICS Journey in Developing a N.C. Climate Science Report](#). 100th Annual Meeting of the American Meteorological Society, Boston, MA, 16 January 2020.

**2019** **Champion, S. M.**, 2019: Understanding the Importance of Data: The National Climate Assessment as a Case Study in Data Transparency and Accessibility. Asheville Museum of Science, Science Pub, Asheville, NC, 29 March 2019.

*\*Referenced in McGuirk, M., 2020: The World Meteorological Organization and Climate Science. Oxford Research Encyclopedia of Climate Science (in review)*

Kunkel, K. E., **S.M. Champion**, Easterling, D. R., J. P. Dissen, O.B. Brown, 2019: NC Climate Science Report Update. NC Climate Change Interagency Council Meeting, Winston-Salem, NC, 16 July 2019.

**2018**

Schattman, R. E., S. Wiener, G. Roesch-McNally, M. T. Niles, B. Parmentier, J. Cobb, and **S. M. Champion**, 2018: Socio-environmental synthesis: Exploring the relationship between drought and the risk perceptions of USDA employees (abstract 344725). 2018 American Geophysical Union Fall Meeting, Washington, D.C., 14 December 2018.

**2017**

**Champion, S. M.**, 2017: The Importance of Summer Season Fronts in Extreme Precipitation Events. American Meteorological Society 23rd Conference on Applied Climatology, Asheville, NC, 27 June 2017.

**Champion, S. M.**, 2017: Metadata and the Sustained Assessment: Data Transparency as Climate Science Communication. American Meteorological Society 23rd Conference on Applied Climatology, Asheville, NC, 27 June 2017.

**Champion, S. M.**, and K. Kunkel, 2017: Sustained Assessment Metadata as a Pathway to Trustworthiness of Climate Science Information. *Invited Talk*, 2017 American Geophysical Union Fall Meeting, New Orleans, LA, 14 December 2017.

**2016**

Kunkel, K., **S. Champion**, R. Frankson, D. Easterling, J. Griffin, J. Runkle, L. E. Stevens, B. Stewart, L. Sun, and S. Veasey, 2016: NOAA's State Climate Summaries for the National Climate Assessment: A Sustained Assessment Product. 2016 American Geophysical Union Fall Meeting, San Francisco, CA, 14 December 2016.

**2015**

**Champion, S.**, and K. Kunkel, 2015: Data Management and the National Climate Assessment: Best Practices, Lessons Learned, and Future Applications. 95th Annual Meeting the American Meteorological Society, Phoenix, AZ, 5 January 2015.

**Champion, S.**, and K. E. Kunkel, 2015: Data Management and the National Climate Assessment: A Data Quality Solution. Invited Talk, 2015 American Geophysical Union Fall Meeting, San Francisco, CA, 14 December 2015.