

# Kenneth Blake Vernon

## Scientific Computing and Imaging Institute

University of Utah

72 So. Central Campus Drive Room 3750

Salt Lake City, Utah 84112

kbvernon.io 

kbvernon 

0000-0003-0098-5092 

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## Professional Appointments

### One-U Responsible AI Postdoctoral Fellow | 2025-Present

Scientific Computing and Imaging Institute

School of Environment, Society, and Sustainability

University of Utah

### Post-Doctoral Associate | 2022-2024

Center for Collaborative Synthesis in Archaeology, CU Boulder

### Assistant Director | 2018-2022

University of Utah Archaeological Center

## Education

University of Utah | Salt Lake City, UT | PhD in Anthropology, 2022

Northern Illinois University | DeKalb, IL | MA in Philosophy, 2009

University of Central Arkansas | Conway, AR | BA in History and Philosophy, 2006

## Publications


### *Peer-reviewed journal articles*


2025

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#### Modeling the rise and demise of Classic Maya cities: Climate, conflict, and economies of scale

*Proceedings of the National Academy of Sciences* 122 (42): e2512325122 (2025)

 Weston C. McCool, Brian F. Coddling, Bridgette Degnan, Claire E. Ebert, Emily S. Johnson, Kenneth Blake Vernon, Kurt M. Wilson, Timothy Beach, Keith M. Prufer, Douglas J. Kennett

 10.1073/pnas.2512325122

## **Environmental drivers of wealth inequality among Ancestral Puebloan farmers in Bears Ears National Monument**

*American Antiquity*: 1-7 (2025)

✉ Roxanne Lois F. Lamson, Kurt M. Wilson, Hayley T. Kievman, Kenneth Blake Vernon, Peter M. Yaworsky, Brian F. Coddling

[doi](https://doi.org/10.1017/aaq.2025.8) 10.1017/aaq.2025.8

**2024**

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## **Trade-off between market and ecosystem services drives settlement decisions among smallholder ranchers in Baja California Sur, Mexico**

*Sustainability Science* 19 (4): 1377-1390 (2024)

✉ Kenneth B. Vernon, Brian F. Coddling, Simon C. Brewer, Shane J. Macfarlan

[doi](https://doi.org/10.1007/s11625-024-01491-9) 10.1007/s11625-024-01491-9

## **The Fremont frontier: Living at the margins of maize farming**

*American Antiquity* 89 (3): 440-458 (2024)

✉ Kenneth B. Vernon, Peter M. Yaworsky, Weston McCool, Jerry D. Spangler, Simon Brewer, Brian F. Coddling

[doi](https://doi.org/10.1017/aaq.2024.22) 10.1017/aaq.2024.22

## **A method for defining dispersed community territories**

*Journal of Archaeological Science* 170: 106048 (2024)

✉ Kenneth B. Vernon, Scott G. Ortman

[doi](https://doi.org/10.1016/j.jas.2024.106048) 10.1016/j.jas.2024.106048

## **The Goldilocks Zone for maize agriculture and the settlement and abandonment of the West Tavaputs Plateau**

*Quaternary International* 689-690: 30-42 (2024)

✉ Peter M. Yaworsky, Kenneth B. Vernon, Weston C. McCool, Isaac A. Hart, Jerry Spangler, Brian F. Coddling

[doi](https://doi.org/10.1016/j.quaint.2023.12.003) 10.1016/j.quaint.2023.12.003

## **Can we reliably detect adaptive responses of hunter-gatherers to past climate change? Examining the impact of Mid-Holocene drought on Archaic settlement in the Basin-Plateau Region of North America**

*Quaternary International* 689-690: 5-15 (2024)

✉ Brian F. Coddling, Heidi Roberts, William Eckerle, Simon C. Brewer, Ishmael D. Medina, Kenneth B. Vernon, Jerry S. Spangler

[doi](https://doi.org/10.1016/j.quaint.2023.06.014) 10.1016/j.quaint.2023.06.014

2022

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### **Ecological constraints on violence avoidance tactics in the Prehispanic Central Andes**

*Environmental Archaeology* 1-14 (2022)

✉ Weston C. McCool, Kurt M. Wilson, Kenneth B. Vernon

[doi](https://doi.org/10.1080/14614103.2022.2137652) 10.1080/14614103.2022.2137652

### **Socioecological dynamics structuring the spread of farming in the North American basin-plateau region**

*Environmental Archaeology* 27 (4): 434-446 (2022)

✉ Brian F. Coddling, Joan Brenner Coltrain, Lisbeth Louderback, Kenneth Blake Vernon, Kate E. Magargal, Peter M. Yaworsky, Erick Robinson, Simon C. Brewer, Jerry D. Spangler

[doi](https://doi.org/10.1080/14614103.2021.1927480) 10.1080/14614103.2021.1927480

### **Decomposing habitat suitability across the forager to farmer transition**

*Environmental Archaeology* 27 (4): 420-433 (2022)

✉ Kenneth B. Vernon, Peter M. Yaworsky, Jerry Spangler, Simon Brewer, Brian F. Coddling

[doi](https://doi.org/10.1080/14614103.2020.1746880) 10.1080/14614103.2020.1746880

### **Subsistence strategy mediates ecological drivers of human violence**

*PLOS ONE* 17 (5): e0268257 (2022)

✉ Weston C. McCool, Kenneth B. Vernon, Peter M. Yaworsky, Brian F. Coddling

[doi](https://doi.org/10.1371/journal.pone.0268257) 10.1371/journal.pone.0268257

### **Climate change–induced population pressure drives high rates of lethal violence in the Prehispanic central Andes**

*Proceedings of the National Academy of Sciences* 119 (17): e2117556119 (2022)

✉ Weston C. McCool, Brian F. Coddling, Kenneth B. Vernon, Kurt M. Wilson, Peter M. Yaworsky, Norbert Marwan, Douglas J. Kennett

[doi](https://doi.org/10.1073/pnas.2117556119) 10.1073/pnas.2117556119

2021

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### **Plant species richness at archaeological sites suggests ecological legacy of Indigenous subsistence on the Colorado Plateau**

*Proceedings of the National Academy of Sciences* 118 (21): e2025047118 (2021)

✉ Bruce M. Pavlik, Lisbeth A. Louderback, Kenneth B. Vernon, Peter M. Yaworsky, Cynthia Wilson, Arnold Clifford, Brian F. Coddling

[doi](https://doi.org/10.1073/pnas.2025047118) 10.1073/pnas.2025047118

2020

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**Marriage dynamics in old Lower California: Ecological constraints and reproductive value in an arid peninsular frontier**

*Biodemography and Social Biology* 65 (2): 156-171 (2020)

✉ Shane J. Macfarlan, Ryan Schacht, Caroline Foley, Sydney Cahoon, Grace Osusky, Kenneth B. Vernon, Evan Tayler, Celeste Henrickson, Eric Schniter

[doi](https://doi.org/10.1080/19485565.2020.1728685) 10.1080/19485565.2020.1728685

**Advancing predictive modeling in archaeology: An evaluation of regression and machine learning methods on the Grand Staircase-Escalante National Monument**

*PLOS ONE* 15 (10): e0239424 (2020)

✉ Peter M. Yaworsky, Kenneth B. Vernon, Jerry D. Spangler, Simon C. Brewer, Brian F. Coddling

[doi](https://doi.org/10.1371/journal.pone.0239424) 10.1371/journal.pone.0239424

2017

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**The ecology of population dispersal: Modeling alternative Basin-Plateau foraging strategies to explain the Numic expansion**

*American Journal of Human Biology* 29 (4): e23000 (2017)

✉ Kate E. Magargal, Ashley K. Parker, Kenneth Blake Vernon, Will Rath, Brian F. Coddling

[doi](https://doi.org/10.1002/ajhb.23000) 10.1002/ajhb.23000

**Manuscripts**

2025

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**Predicting PHT archaeology on the northwest Colorado Plateau: A predictive model for determining targeted survey areas**

*Journal of Archaeological Science: Reports* (in prep)

✉ Abby S. Baka, Kenneth B. Vernon, Simon C. Brewer, Brian F. Coddling, Jerry D. Spangler, Alexandra M. Greenwald

**Targeted explorations of Pleistocene-Holocene transition archaeology on the Colorado Plateau in southern Utah**

*Quaternary International* (accepted)

✉ Abby S. Baka, Kenneth B. Vernon, Madeline E. Mackie, Simon C. Brewer, Jerry D. Spangler, Brian F. Coddling, Lisbeth Louderback, Thomas Flanigan, Alexandra M. Greenwald

**Indirect dating with mixture density networks**

*Journal of Archaeological Science* (in prep)

✉ Kenneth B. Vernon, Brian F. Coddling, Simon C. Brewer

## **A reconstruction of the Indigenous maize farming niche of Utah**

*Journal of Archaeological Science: Reports* (under review)

✉ Ishmael D. Medina, Kenneth B. Vernon, Weston C. McCool, Jerry D. Spangler, Brian F. Coddling

## **The impact of subsistence change on demography: Theory-informed Approximate Bayesian Computation reveals 4-fold increase in carrying capacity following economic intensification**

*Journal of Archaeological Science* (under review)

✉ Kurt M. Wilson, Brian F. Coddling, Weston C. McCool, Ishmael Medina, Kenneth B. Vernon, Simon C. Brewer

## **The evolution of a labor market**

(in prep)

✉ Kenneth B. Vernon

## **Socio-economic status before we measured it: A machine learning approach to imputing income and education in the US Census before 1950**

(in prep)

✉ Kelsey Carlston, Kenneth B. Vernon

## **Responsible artificial intelligence and the science of human-environment interactions**

*Environmental Data Science* (in prep)

✉ Kenneth B. Vernon, Brian F. Coddling, Simon C. Brewer

## **Explaining PaleoIndian settlement in the Intermountain West**

*American Antiquity* (in prep)

✉ Kenneth B. Vernon, Kate E. Magargal, David Zeanah, D. Craig Young, Robert G. Elston, Simon C. Brewer, Brian F. Coddling

## **Migration and environmental learning in interstitial areas: An example from the Northern Rio Puerco Valley, New Mexico**

*Open Archaeology* (under review)

✉ Kenneth B. Vernon, Scott G. Ortman, Donald A. Shiffler

## **Book reviews**

**2020**

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## **Review of Oshara Revisited: The Archaic Period in Northern New Mexico by Nicholas Chapin**

*Journal of Anthropological Research* 76 (1): 138–140 (2020)

✉ Kenneth B. Vernon, Brian F. Coddling

[doi](https://doi.org/10.1086/706946) 10.1086/706946

## ***Technical reports***

**2022**

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### **Archaeological Survey of Cottonwood Wash, San Rafael Desert, Emery County, Utah**

Report submitted to the Bureau of Land Management, Price Field Office, Price, Utah; and State of Utah School and Institutional Trust Lands Administration, Salt Lake City, Utah. Prepared by the University of Utah Archaeological Center and the Colorado Plateau Archaeological Alliance. BLM Cooperative Agreement L20AC00267. United States Department of Interior Permit No. 21UT85115. State of Utah Antiquities Project No. U22UA031. University of Utah Archaeological Center Project No. UUAC22052.

✉ Ishmael Medina, Kenneth B. Vernon, Kate E. Magargal, Weston C. McCool, Jerry D. Spangler, Brian F. Coddling

**2021**

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### **Limited Test Excavations at Red Reef Shelter (42WS519), Red Cliffs National Conservation Area, Washington County, Utah**

Report submitted to the Bureau of Land Management, St. George, Utah.

✉ Jerry D. Spangler, Matthew Zweifel, Heidi Roberts, Kenneth B. Vernon, Isaac Hart, Brian F. Coddling, Anne Lawlor

**2019**

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### **Hisatsinom of the high plateaus: a Class I overview of prehistoric cultural resources in Grand Staircase-Escalante National Monument**

Report submitted to the Bureau of Land Management, Salt Lake City, Utah.

✉ Jerry D. Spangler, Peter M. Yaworsky, Kenneth B. Vernon, Brian F. Coddling

**2018**

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### **Preliminary Archaeological Investigations at the Jack Kirk Site, Mariposa Creek, California**

Report submitted to the North Fork Mono Tribe, Mariposa Creek, California.

✉ Brian F. Coddling, Kate E. Magargal, Kenneth B. Vernon, Paul E. Allgaier, Jess Valdez, Ron Goode

### **The Archaeology of Molen Reef, Emery County, Utah**

Report submitted to the Southern Utah Wilderness Alliance, Salt Lake City, Utah.

✉ Kenneth B. Vernon, Peter M. Yaworsky, Jerry D. Spangler


# Grants, Fellowships, and Awards

**2022**

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## **Archaeological Survey of Cottonwood Wash, San Rafael Desert, Emery County, Utah**

Cooperative Agreement, Bureau of Land Management.

 Brian F. Coddington, Jerry D. Spangler

**2020**

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## **Advancing Stewardship with Theory and Models**

David C. Williams Memorial Graduate Fellowship, University of Utah College of Social and Behavioral Sciences.

 Kenneth B. Vernon

## **Developing a Modular Online Introduction to the R Environment**

Cross-College Training Grant, University of Utah College of Social and Behavioral Sciences.

 Simon Brewer, Brian F. Coddington, Kenneth B. Vernon

**2019**

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## **Advancing Stewardship with Theory and Models**

David C. Williams Memorial Graduate Fellowship, University of Utah College of Social and Behavioral Sciences.

 Kenneth B. Vernon

## **Graduate Research**

Earl and Elies Skidmore Endowed Graduate Fellowship, University of Utah College of Social and Behavioral Sciences.

 Kenneth B. Vernon

**2018**

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## **Advancing Stewardship with Theory and Models**

David C. Williams Memorial Graduate Fellowship, University of Utah College of Social and Behavioral Sciences.

 Kenneth B. Vernon

## **Why Were Prehistoric Agricultural Societies in Utah Unable to Adapt to the Medieval Megadroughts?**

Interdisciplinary Faculty Research Seed Grant, University of Utah Global Change and Sustainability Center.

 Brian F. Coddington, Simon Brewer

2017

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### **Archaeological Sites as Endangered Species: Using Next Generation Models to Predict and Protect Cultural Properties on the Grand Staircase-Escalante National Monument**

Grand Staircase-Escalante National Monument Cooperative Agreement, Bureau of Land Management.

👤 Brian F. Coddling

### **Human Plant Use in Red Butte Canyon**

Research Grant, University of Utah Global Change and Sustainability Center.

👤 Kenneth B. Vernon

### **Human Plant Use in Red Butte Canyon**

Research Grant, Friends of Red Butte.

👤 Kenneth B. Vernon

## **Presentations**

2025

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### **Indirect dating with Mixture Density Networks**

Utah Center for Data Science, Data Science & AI Lecture Series, Salt Lake City, UT.

👤 Kenneth B. Vernon, Brian F Coddling, Scott G. Ortman, Simon C. Brewer

### **Promoting water-use efficiency with responsible AI**

One-U Responsible AI Annual Symposium, Salt Lake City, UT.

👤 Kenneth B. Vernon

### **Indirect dating with Mixture Density Networks**

90th Annual Meeting of the Society for American Archaeology, Denver, CO.

👤 Kenneth B. Vernon, Brian F Coddling, Scott G. Ortman, Simon C. Brewer

2024

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### **The network ecology of settlement persistence**

30th Annual Meeting of the European Archaeological Association, Rome, Italy.

👤 Kenneth B. Vernon, Simon C. Brewer, Brian F. Coddling, Scott G. Ortman

### **The network ecology of settlement persistence**

workshop 'Advances in modelling past human ecosystems', Cologne, Germany.

👤 Kenneth B. Vernon, Simon C. Brewer, Brian F. Coddling, Scott G. Ortman



## **The socio-ecology of community centers**

89th Annual Meeting of the Society for American Archaeology, New Orleans, LA.

👤 Kenneth B. Vernon, Scott G. Ortman

## **2023**

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### **The ecology of agglomeration and the rise of Chaco Great Houses**

88th Annual Meeting of the Society for American Archaeology, Portland, OR.

👤 Kenneth B. Vernon, Weston C. McCool, Simon C. Brewer, Brian F. Coddling, Scott G. Ortman

### **Exploring the dynamics of late precontact obsidian procurement and exchange networks across the US Southwest and Northwest Mexico using cyberSW**

The Southwest Symposium Archaeological Conference, Santa Fe, NM.

👤 Sarah Oas, Kenneth B. Vernon, Matthew A. Peeples, Barbara J. Mills, Joshua Watts, Jeffery J. Clark, Steven Shackley, Scott G. Ortman

### **How do I work this? this R project**

Spatial Utah Data Science (SUDS) Meeting, Salt Lake City, UT.

👤 Kenneth B. Vernon

### **A core-periphery approach to defining community boundaries**

29th Annual Meeting of the European Archaeological Association, Belfast, Northern Ireland.

👤 Kenneth B. Vernon, Scott G. Ortman

## **2022**

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### **The Fremont frontier: Living at the margins of maize farming**

87th Annual Meeting of the Society for American Archaeology, Chicago, IL.

👤 Kenneth B. Vernon, Jerry D. Spangler, Weston C. McCool, Peter M. Yaworsky, Simon C. Brewer, Brian F. Coddling

## **2021**

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### **Explaining PaleoIndian settlement in the Intermountain West: A regression adjustment approach**

86th Annual Meeting of the Society for American Archaeology, San Francisco, CA.

👤 Kenneth B. Vernon, David Zeanah, D. Craig Young, Robert G. Elston, Brian F. Coddling

2019

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### **Decomposing habitat suitability with theory-driven machine-learning**

84th Annual Meeting of the Society for American Archaeology, Albuquerque, NM.

👤 Kenneth B. Vernon, Peter M. Yaworsky, Brian F. Coddling

2018

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### **Prearchaic land use in Grass Valley, Nevada: This time with Bayes**

Bi-annual Great Basin Anthropological Conference, Salt Lake City, UT.

👤 Kenneth B. Vernon, Peter M. Yaworsky, Kate E. Magargal, D. Craig Young, David Zeanah, Brian F. Coddling

### **Prearchaic land use in Grass Valley, Nevada: A novel statistical implementation of optimal distribution modeling**

83th Annual Meeting of the Society for American Archaeology, Washington D.C..

👤 Kenneth B. Vernon, Peter M. Yaworsky, Kate E. Magargal, D. Craig Young, David Zeanah, Brian F. Coddling

2015

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### **Numic fires: Modeling the effects of anthropogenic fire on foraging decisions in the Great Basin**

80th Annual Meeting of the Society for American Archaeology, San Francisco, CA.

👤 Kenneth B. Vernon, Kate E. Magargal, Ashley K. Parker, Will Rath, Brian F. Coddling

## **Teaching**

**Teaching interests.** Behavioral Ecology, Urban Science, Environmental Data Science, Statistics, Geography, Conservation & Sustainability, Human Prehistory, North American Prehistory.

### **University of Utah**

- ANTH 1010: Culture and the Human Experience
- ANTH 1030: Introduction to World Prehistory
- ANTH 5850: Quantitative Analysis of Archaeological Data

## **Professional Affiliations**

**Great Basin Anthropological Association** | 2016-present


**Society for American Archaeology** | 2014-present

**Coalition for Archaeological Synthesis** | 2022-present


European Association of Archaeologists | 2023-present

## Service, Outreach, and Other Activities

**Studio Lab** | University of Colorado, Boulder, 2022-2024.

 **Mentor.** Supporting undergraduate research.

**Undergraduate Research Opportunities Program.** | University of Utah, 2018-2022.

 **Mentor.** Supporting undergraduate research.

**Journal Club: Problems in Evolutionary Anthropology** | University of Utah, 2018-2022.

 **Organizer.**

**Hopi Tribe v Donald J. Trump, Utah Diné Bikéyah v Donald J. Trump, Natural Resources Defense Council v Donald J. Trump** | 2018.

Brief Amici Curiae of Archaeological Organizations in Support of Plaintiffs.

 **Contributor.**

## References

*Available upon request.*