Patricia Spellman

Curriculum Vitae
October 2022

Assistant Professor
University of South Florida
Tampa, FL

Office: SCA 510 *Email: pdspellm@usf.edu*

1. EDUCATION

Michigan Technological University *Ph.D. Civil Engineering* 2013-2016
Dissertation title: Flood risk evolution: examining causes of changes in flood risk and consequences for flood risk analysis

University of Florida *M.S. Geology* 2010-2012
Thesis title: River losses at a karst escarpment during normal flow and flood conditions and implications for carbonate weathering

University of South Florida *B.S. Geology; Minor: Mathematics* 2005-2009

2. PROFESSIONAL APPOINTMENTS

Assistant Professor
School of Geosciences, University of South Florida 2019-Present

Post-Doctoral Researcher
Environmental Engineering Sciences, University of Florida 2017-2019

National Science Foundation GK12 Fellow 2013-2016

Graduate Research Assistant
Civil Engineering, Michigan Technological University 2013

Graduate Teaching Assistant,
Geological Sciences, University of Florida 2012

Graduate Research Assistant
Geological Sciences, University of Florida 2010-2011

3. RESEARCH AREAS

- Karst hydrogeology and geomorphology
- Small island nation hydrology
- Surface and groundwater interactions
- Sustainable agricultural practices

- Stochastic hydrology
- Development and modification of models for hydrological systems
- Remote sensing techniques for water resource management
- Code/program development (MATLAB, Python)

4. GRANTS AND FUNDING

Most recent funding listed first.

FUNDED
TOTAL FUNDING RECEIVED: $230,006

2022 (Total: $139,593)

1. *Spring continuous monitoring analysis*. PI: Patricia Spellman. *Florida Department of Environmental Protection* ($75,512)

2. *Springs isotope analysis* PI: Patricia Spellman. *Florida Department of Environmental Protection* ($67,081)

2021 (Total: $67,413)

3. *Identifying changing source water contributions to springs across the Suwannee River Basin using isotopic analysis*. PI: Patricia Spellman. *Florida Fish and Wildlife Foundation* ($22,163)

4. *Time-series analysis of water quality and quantity parameters of springs within the Suwannee River Water Management District* PI: Patricia Spellman. *Suwannee River Water Management District* ($17,500)

5. *Hydrogeological analysis to support the development of the North Florida Southeast Georgia Model.* PI: Patricia Spellman. *Suwannee River Water Management District* ($15,750)

6. *Update: Developing hydrological models to address return flows from irrigation*. PI: Patricia Spellman. *Suwannee River Water Management District.* ($12,000)

2020 (Total: $25,000)

1. *Comparing the effects of land use and climate on baseflows in the lower Withlacoochee River.* PI: Patricia Spellman. *Suwannee River Water Management District* ($13,000)

2. *Developing hydrological models to address return flows from irrigation*.
   PI: Patricia Spellman. *Suwannee River Water Management District.* ($12,000)

5. PUBLICATIONS

[*Mentored/Advised Student, **Authorship]**

a. Preparing for submission/submitted

1. **Spellman, P.**, Brown, A. *Development of a novel method to determine transient, low energy pumping signals from hydrological data using linear models and wavelet decomposition. In prep*. Target Journal: Water Resources Research *IF: 4.26*

2. **Spellman, P.**, Salazar, N.*, Breithaupt, C., Gulley, J., Martin, J., *Recharge dynamics and thresholds on a low-lying carbonate island. In prep*. Target Journal: Nature: Communications Earth and Environment. *IF: 4.26*

b. Refereed publications (13)

1. **Spellman, P**. Gulley, J., Pain., A., Flint., M., Kim, S.*, Rath, S.*, (2022) Statistical evidence that karst aquifer nitrate variability is primarily controlled by recharge and supply: Example from the Floridan Aquifer System. Science of the Total Environment *(IF: 7.93)*

2. **Spellman, P.**, Breithaupt, C., Bremner, P., Gulley, J.D., Jenson, J., Lander, M., (2022) Estimates of travel time and storage dynamics in a thick, island karst vadose zone using spectral analysis. *Water Resources Research IF: (4.26)*

3. **Spellman, P.**, Pritt, A.B.C.*, Salazar, N.* (2021) Tracking changing water budgets across the Bahamian Archipelago. *Journal of Hydrology (IF: 4.30)*

4. **Spellman, P.**, Webster, V. (2020) Quantifying long-term and event-scale baseflow effects across the flood frequency curve. *Journal of American Water Resources Association (IF: 2.46)*

5. **Spellman, P.**, Martin, J.B., Gulley, J.D., Loucks, J. (2019) The role of antecedent groundwater heads in controlling transient aquifer storage and flood peak attenuation in karst watersheds. *Earth Surface Processes and Landforms.* DOI: 10.1002/esp.4481 *(IF: 3.52)*

6. Brown, A.L., Martin, J.B., Kamenov, G.D., Ezell, J.E., Screaton, E.J., Gulley, J. and **Spellman, P**., (2019). Trace metal cycling in karst aquifers subject to periodic river water intrusion. *Chemical Geology*, p.118773. *(IF: 3.62)*

7. **Spellman, P.**, Webster, V., Watkins, D. (2018) Bias correcting instantaneous peak flows generated from a continuous semi-distributed hydrological model. *Journal of Flood Risk Management.* DOI: 10.1111/jfr3.12342 *(IF: 3.24)*

8. Gulley, J. D., Martin, J. B., Moore, P. J., Brown, A., **Spellman, P.,** and Ezell, J. (2015) Heterogeneous distributions of CO_2 may be more important for dissolution and karstification in coastal eogenetic limestone than mixing dissolution. DOI: 10.1002/esp.3705. *Earth Surface Processes and Landforms,* v. 40: pp. 1057–1071. *(IF: 3.52)*

9. Brown, A. Martin, J. B., Screaton, Elizabeth, Ezell, J, **Spellman, P**., Gulley, J. D. (2014) Bank storage in karst aquifers: The impact of temporary intrusion of river water on carbonate dissolution and trace metal mobility. *Chemical Geology*, v. 385: pp. 56-69. *(IF: 3.24)*

10. Gulley, J. D., **Spellman, P.,** Covington, M. D., Martin, J. B., Benn, D. I. Catania, G. (2014) Large values of hydraulic roughness in subglacial conduits during conduit enlargement: Implications for modeling conduit evolution. *Earth Surface Processes and Landforms*, v. 39: pp. 296–310. *(IF: 3.52)*

11. Gulley, J. D., Martin, J. B., **Spellman, P**., Moore, P. J., Screaton, E. J. (2014) Influence of partial confinement and Holocene river formation on groundwater flow and dissolution in the Florida carbonate platform. DOI: 10.1002/esp.3447. *Hydrological Processes*, v. 28: pp. 705-717. *(IF: 3.19)*

12. LaFond, K., Griffis, V., **Spellman, P**. (2014) Forcing hydrologic models with GCM output: Bias correction vs. the "Delta Change" method. DOI: 10.1061/9780784413548.214. *World Environmental and Water Resources Congress*. pp. 2146-2155.

13. Martin J.B., Gulley J.D., **Spellman, P.** (2011) Tidal pumping of water between Bahamas blue holes, the aquifer and the ocean. *Journal of Hydrology*, v. 416: pp. 28-38. *(IF: 3.73)*

c. Technical Reports (5)

1. **Spellman, P.,** (2021c) Hydrogeological analysis to support the North Florida Southeast Georgia model. *Prepared for Suwannee River Water Management District*
2. **Spellman, P.,** (2021b) Update to the farm-scale Soil and Water Assessment Tool return flows project. *Prepared for Suwannee River Water Management District*
3. **Spellman, P.,** (2021a) Realtime springshed analysis within the Suwannee River Basin. *Prepared for Suwannee River Water Management District*

4. **Spellman, P.,** (2020b) Development of statistical models to quantify impacts of factors including climate and groundwater pumping on lower Withlacoochee River baseflow and Madison Blue springs. *Prepared for Suwannee River Water Management District*
5. **Spellman, P.**, (2020a) Farm-scale water budgets using the Soil and Water Assessment Tool. *Prepared for Suwannee River Water Management District*

6. PRESENTATIONS (23)

a. International Professional Meeting Presentations

*† Invited speaker, * Mentored student*

1. Stepchinski, L*., **Spellman, P**., Rains, M. Influence of hydrologic connectivity on the natural flow regime of archetypal wetland complexes. University Florida Water Institute Meeting 2022
2. **Spellman, P.**, Gulley, J. Quantifying vadose storage and release in a young, uplifted karst aquifer using spectral analysis. University Florida Water Institute Meeting 2022.
3. Kim, S., **Spellman., P.** Recharge dynamics under irrigated lands in humid landscapes. American Geophysical Union (AGU) Annual Meeting 2021
4. Kastelic, E., **Spellman., P.** Investigating the Impact of Extreme Events on Aquifer Levels and River Baseflows in the Suwannee River Basin, Florida. American Geophysical Union (AGU) Annual Meeting 2021
5. **Spellman, P.**, Gulley, J., Pain., A., Flint., M., Rath, S., Kim, S., Statistical evidence that upper Floridan Aquifer nitrate variability is primarily controlled by recharge and supply. American Geophysical Union (AGU) Annual Meeting 2021
6. **Spellman, P†.**, Brown, A., The utility of wavelet analysis to inform linear models of hydrological time series: Application to quantify the comparative effects of climate and pumping on spring discharge at Madison Blue Springs, Florida. Geological Society of America (GSA) Annual Meeting 2020
7. **Spellman P**., De Rooij, R., Rath, S., Reaver, N., Graham, W., Kaplan, D., The importance of process representation for simulating coupled surface-groundwater flow in karst watersheds: a comparison of SWAT, SWAT-MODFLOW and DisCo. American Geophysical Union (AGU) Annual Meeting 2019
8. Rath, S.,* **Spellman P.,** Reaver, N. ,Lee, D., Graham, W., Kaplan, D. Quantifying the Effects of Land Use and Management on Receiving Water Quantity, Quality, and Ecosystem Health in a Karst Watershed. American Geophysical Union (AGU) Annual Meeting 2019
9. **Spellman, P.**, Kaplan, D., Graham, W., Rath, S*. Documenting the development and use of coupled surface and groundwater models to determine the fate of nutrients in a karst aquifer. American Geophysical Union (AGU) Annual Meeting 2018
10. **Spellman P.**, Kaplan, D., Graham, W. de Rooij, R. Impacts of land use and climate change on groundwater quality and quantity in a karst watershed. International Environmental Modeling and Software (IEMSS) 2018
11. **Spellman P.**, Webster, V. Developing a new regional flood skew for the Suwannee River Basin, FL University of Florida Water Symposium. 2018

12. **Spellman P.**, Kaplan, D. The efficacy of different gridded climate datasets in simulating hydrological output in the Santa Fe River Basin, FL. University of Florida Water Symposium. 2018
13. **Spellman, P.**, Martin, J.B., Gulley, J.D. Hydrological controls on transient aquifer storage in a karst watershed. American Geophysical Union (AGU) Annual Meeting 2017
14. **Spellman, P.,** Webster, V. Comparative effects of land use and climate change on flood risk. Environmental and Water Resources (EWRI) Congress 2017
15. **Spellman P.,** Webster V. Differential impacts of baseflow on the flood frequency curve. American Geophysical Union (AGU) Annual Meeting 2016
16. **Spellman P.** , Webster, V. Bias correcting flood series data from SWAT model output: A comparison of methods.
17. **Spellman P.**, Martin, J., Mayer, A. A teaching unit engineered to bring water resources problems into the middle school classroom. Geological Society of America (GSA) Annual Meeting 2015
18. **Spellman P**., Griffis, V. The role of basin interactions on flood frequency analysis. Environmental and Water Resources (EWRI) Congress 2014
19. **Spellman P**., Griffis, V. Streamflow across physiographic boundaries: Implications for flood frequency analysis in karst terrain. Geological Society of America (GSA) Annual Meeting 2013
20. **Spellman, P.**, Martin, J., Screaton, E., Gulley, J., and Brown, A. Using MODFLOW with CFP to understand conduit-matrix exchange in a karst aquifer during flooding. American Geophysical Union (AGU) Annual Meeting 2011.
21. **Spellman P.**, Screaton, E.J., Martin J.B. Gulley J.D., Brown A. Using MODFLOW-2005 and CFP to understand the dynamics of groundwater flow in a karst springshed during floods. Geological Society of America (GSA) Annual Meeting 2011
22. Brown, A., Martin, J., Screaton, E.J., **Spellman, P.**, and Gulley, J. The impact of river water intrusion on trace metal cycling in karst aquifers: an example from the Floridan Aquifer System at Madison Blue Spring, Florida. American Geophysical Union (AGU) Annual Meeting 2011
23. **Spellman P.**, Screaton E.J., Martin J.B. The role of a river in a mixed siliciclastic-carbonate environment Geological Society of America (GSA) Annual Meeting 2010

b. Seminars and lectures

2022 Calling Earth Podcast†
2022 University of South Florida Environmental and Water Resources Engineering Seminar "*Analysis of a low-frequency nitrate signal at springs draining the Floridan Aquifer: Implications for nutrient management.* "
2019 University of South Florida Geoscience Symposium "*Reacting to Nitrates"*
2016 Michigan Technological Environmental Engineering Seminar *"Going to extremes: Floodwater storage effects on flood risk estimation"*

7. STUDENT COMMITTEES AND ADIVISING

[**Primary Advisor** *Committee Member*]

Post-Doctoral Associates

- **Ali Al-Quraishi** (2022) – Visiting from University of Florida

Ph.D.

- **Sunhye Kim** (2020-Present)
  - **Project:** Consequences of agriculture on water quality and quantity in the Floridan Aquifer System
- **Amy Pritt (**2022**-**Present)
  - Changes to hydraulic connectivity on San Salvador, Bahamas with implications on ecosystem services

M.S.

- **Natalie Salazar** (2021-Present)
  - **Project**: Causes of lake level variability on San Salvador Island, Bahamas
- **Mahnoor Kamal (**2021-Present)
  - **Project**: Spatial variability in water quality parameters at Peacock Springs in the Floridan Aquifer System: Implications for water quality interpretation and monitoring in karst aquifers

PSM Students

- **Vincent Carter** (Fall 2021)
  - Hydrogeology Internship
- **Stephen Smith** (Present)
  - Hydrogeology Internship

Previous students

- **Eric Kastelic** (2021-2022)
  - **Project**: Time series analysis of groundwater levels in the Upper Floridan Aquifer and consequences of extreme events
  - **Currently PhD student University of Wisconsin** - *Madison*

Committees Served

- *Esra Zengin* – M.S. (2021-Present)
- *Leanne Stepchinski* – Ph.D. (2020-Present)
- *Nick Soto-Kerans* – M.S. (Graduated 2021)
- *Charlie Breithaupt* – Ph.D. (Graduated 2020)
- *Quanghee Yi* – Ph.D. (Graduated 2020)

8. TEACHING

Environmental Hydrology (GEO3280)	Fall/Spring Sections
Numerical Modeling of Hydrological Systems (GLY6830)	Spring Section
Professional Hydrogeology Internship (GLY6492)	Fall/Spring Sections
L'Anse Middle School Student Teacher (GK12 Fellow)	2014-2016

Lab Instructor – Physical Geology 2010
Sanford Brown Technical College (Mathematics) 2009

9. SERVICE AND OUTREACH

Internal (USF)

- Graduate Committee
- Advisor for Professional Science Master degree (PSM)
- Divemaster aid for Scientific Diving (GLY4930)

External

- Committees
  - Spring Coast Committee (2022-Present)
  - Continuous monitoring dashboard for Florida Department of Environmental Protection (2021-Present)
  - Continuing **REEF** Survey Participant (diving)
- Reviewer
  - *Water*
  - *Nature*
  - *Journal of Hydrology*
  - *Journal of Hydrologic Engineering*
  - *Journal of American Water Resources Association*
  - *Remote Sensing of the Environment*
  - *Ecohydrology*

10. PROFESSIONAL AFFILIATIONS

- American Geophysical Union (AGU)
- Geological Society of America (GSA)
- National Speleological Society – Cave Diving Section (NSS-CDS)

11. PROFESSIONAL SKILLS

- SCUBA Diving (Full Cave (TDI) certified and Divemaster (PADI))
- Programming in MATLAB, Python (less so)
- GIS (ArcMap and QGIS)