

# GREGORY J. BRUNNER

## HOME ADDRESS

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## WORK ADDRESS

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## PROFILE

Mr. Brunner is an experienced Scientist, Programmer, and Professor with a demonstrated history of solving problems involving big data, geographic data, and imagery. He is an expert in the fields of Geographic Information Systems, Geospatial Application Development, Remote Sensing, Big Data Analytics, Python, and ArcGIS. He is an excellent teacher who has taught undergraduate and graduate level geospatial programming courses at St. Louis University. He is an intelligent and passionate research professional with a Master of Science (MS) focused in Physics from Rice University. He has given presentations across the world on topics ranging from Green Infrastructure to Augmented Reality.

## EXPERIENCE

### Senior Scientist

Esri  
St. Charles, MO

April 2016 – Present

Currently serves as the lead on multiple projects within Esri. Lead developer on an effort to develop data quality and data comparison algorithms. Lead scientist on an effort to implement large scale raster processing and machine learning algorithms using Amazon Web Services and ArcGIS Image Server. Lead developer for the Esri Python raster function development effort (<https://github.com/Esri/raster-functions/>). Presented at numerous conferences, including, but not limited to Esri's Federal GIS Conference, Esri's Developer Summit, and Domino Data Lab's Data Science Pop-up.

### Imagery Scientist

Esri  
St. Charles, MO

July 2011 – Apr 2016

Led effort to develop a framework to evaluate large amounts of geographic content. Developed Python tools to automate content assessment. Developed imagery processing pipeline that extracted 3D point clouds from oblique aerial photos. Presented at numerous conferences on topics including, but not limited to 3D augmented reality, imagery analysis, and geographic data quality.

### Adjunct Professor

St. Louis University  
St. Louis, MO

Jan 2017 – Present

Teaches GIS 4091/5091 – *Advanced Programming for GIS and Remote Sensing* and GIS 4090/5090 – *Programming for Remote Sensing/GIS*. GIS 4090/5090 introduces students to Python programming and its applications to remote sensing and GIS. Through completing this course, students are able to use Python to perform common GIS and remote sensing analysis tasks, automate workflows, and develop custom Python tools. Topics include describing data, manipulating data, automating spatial analysis tasks, creating Python scripts and tools, and using Python for imagery analysis. In GIS 4091/5091, students learn how to publish, consume, and analyze web services using Python, Javascript, and HTML. They are introduced to powerful, advanced Python libraries such as Pandas, Numpy, ArcGIS, and Folium in addition to learning advanced geographic data visualization techniques that leverage Python, Javascript, and web APIs. They also learn how to use the Javascript to create their first stand-alone web applications. This class builds on what students learned in GIS 4090/5090 and helps them develop knowledge and skills that they will use throughout their careers.

### GeoSLU Advisory Board

St. Louis University  
St. Louis, MO

Aug 2018 – Present

Currently serving on the advisory board for the GeoSLU Big Idea, an initiative to enhance geospatial research, training, and innovation at St. Louis University.

**Geospatial Advisory Board**      Kaskaskia College      Aug 2015 – May 2018  
Centralia, IL

Served on the Advisory Board for the Kaskaskia College (KC) GIS Program which was awarded a NSF-ATE grant linking a new geospatial technology program at KC to local/regional industry in South-Central IL.

**Associate Scientist**      Sensing Strategies, Inc.      Mar 2008 – July 2011  
Pennington, NJ

Developed algorithms for the analysis of space-based and ground-based sensor data in MATLAB. Implemented algorithms in data analysis software written in C++. Designed user interface for viewing sensor data. Implemented geographic information system software TatumGIS and Google Maps in graphical user interface for analyzing sensor data. Performed analysis on LiDAR sensor data. Constructed images from sensor data. Calibrated sensors in laboratory. Participated in field tests of remote sensing equipment.

**Graduate Student Researcher**      Rice University      June 2005 – Mar 2008  
Houston, TX

Completed multiple astronomy research projects in collaboration with scientists across the world that led to publications and conference presentations. Developed computational algorithms to analyze large volumes of spectral data. Composed a research grant and received approval from Spitzer Science Center and the NASA Jet Propulsion Lab.

**Visiting Research Fellow**      Spitzer Science Center, Caltech      Aug 2006 – Feb 2007  
Pasadena, CA

Worked with *Spitzer Space Telescope* Infrared Spectrograph instrument team to develop data reduction pipeline that decomposes spectroscopic data cubes into maps. Wrote paper summarizing our analysis of spectra from nearby galaxies.

## PROJECTS

**Advanced Python for GIS**      <https://github.com/gbrunner/adv-python-for-gis-and-rs>  
Write Description here

**Esri Raster Functions**      <https://github.com/Esri/raster-functions>  
Write Description here

**State of the Data**      <https://github.com/ngageoint/state-of-the-data/>  
Write Description here

**GEOINT in Motion**      <https://github.com/ngageoint/geoint-in-motion>  
Write Description here

## EDUCATION

Rice University, Houston, TX  
M.S., Physics, 2008

Johns Hopkins University, Baltimore, MD  
B.S., Physics, 2005  
Minor in Earth and Planetary Science

## HONORS AND AWARDS

Certificate of Appreciation from the National Geospatial-Intelligence Agency's Geospatial Analyst Hub (GA Hub) for *Capturing and Sharing Technical How – To*, June 2018  
Certificate of Appreciation from the National Geospatial-Intelligence Agency's Geospatial Analyst Hub (GA Hub) for *Excellence in Using Statistics in Python*, July 2017  
Certificate of Appreciation from the National Geospatial-Intelligence Agency's Geospatial Analyst Hub (GA Hub) for *Python Party Presenting – Sharing Scripting Expertise with Others in an Engaging Manner*, June 2016  
Spitzer Visiting Graduate Student Fellow, Spitzer Science Center, 2006–2007  
NASA Undergraduate Student Research Program Fellow, NASA Jet Propulsion Lab, Summer 2004  
Caltech Summer Undergraduate Research Fellow, California Institute of Technology, Summer 2004

## PROFESSIONAL AFFILIATIONS

The American Society for Photogrammetry and Remote Sensing, ASPRS (2011 - 2018)  
Association for Unmanned Vehicle Systems International, AUUVSI (2014 - 2016)  
ASPRS Heartland Region Director (2015 - 2016)  
ASPRS Heartland Region President (2013 - 2014)  
The American Astronomical Society (2006 - 2011)

## SELECTED PRESENTATIONS

*GeoPlanner for ArcGIS: Use in Green Infrastructure Planning and Beyond*. Esri Federal GIS Conference. Washington, DC. March 2018.

*Making Data Science Tangible* Domino Data Pop-up. Chicago, IL. November 2017.

*Enabling Apps for Green Infrastructure Planning*. Esri Federal GIS Conference. Washington, DC. February 2017.

*Thunder Up! Mapping Russell Westbrook's Shots with Python and ArcGIS*. Oklahoma South Central ArcGIS User Group. Oklahoma City, OK. September 2016.

*Global Data Management Using Content Suitability Indicators*. 2016 Esri International User Conference. San Diego, CA. July 2016.

*Writing Image Processing Algorithms with the Python Raster Function*. 2016 Esri Developer Summit. Palm Springs, CA. March 2016.

*What's the State of the Data?* 2015 Esri International User Conference. San Diego, CA. July 2015.

*GeoPlanner for ArcGIS: An Overview*. 2015 Esri Federal User Conference. Washington, DC. February 2015.

*Not a Web-Developer? Not a Problem! Using Open, Free, Configurable GIS Web-Applications to Jumpstart Your GIS Application Development Project*. ASPRS 2014 Annual Conference. Thought Leader Presentation. Louisville, KY. March 2014.

*Managing Airport Airspace Using 3D Augmented Reality*. Air Traffic Controllers Association International Conference. Amsterdam, The Netherlands. March 2013.

*Graduate Education and Careers in Science*. Holy Ghost Preparatory School Senior Career Day. Bensalem, PA. October 2008, 2009, and 2010.

*Mapping the Spatial Distribution of H<sub>2</sub> and PAH Emission in Nearby Galaxies with the Spitzer IRS*. 211<sup>th</sup> meeting of the American Astronomical Society. Austin, TX. January 2008.

*Mapping the Spatial Distribution of Warm  $H_2$  in Nearby Galaxies with the Spitzer IRS.* Spitzer Conference on the ISM in the Milky Way and Nearby Galaxies. Pasadena, CA. December 2007.

*Mapping Ne, S, and  $H_2$  across M51 with the Spitzer IRS.* Deep Spectroscopy and Modeling of Nebular Emission Workshop. Beijing, China. April 2007.

*Spitzer IRS Spectral Maps of Spatially Resolved Molecular Hydrogen in NGC5194.* 209<sup>th</sup> Meeting of the American Astronomical Society. Seattle, WA. January 2007.

## PUBLICATIONS, CONFERENCE PROCEEDINGS, AND PRESS RELEASES

*Mapping the Spatial Distribution of Warm  $H_2$  in Nearby Galaxies with the Spitzer Infrared Spectrograph.* **Brunner, G.**, Dufour, R., Sheth, K., Armus, L., Wolfire, M., Vogel, S., and Schinnerer, E. 2009. The Evolving ISM in the Milky Way and Nearby Galaxies.

*Observations of M33 H II Regions: The Ne/S Ratio, Metallicity, and Ionization Variations.* Rubin, R.H., Simpson, J.P., McNabb, I.A., **Brunner, G.**, Colgan, S.W.J., Dufour, R., Pauldrach, A.W.A., Browne, A.D., Zhang, R., and Csongradi, E.J. 2009. The Evolving ISM in the Milky Way and Nearby Galaxies.

*Warm Molecular Gas in M51: Mapping the Excitation Temperature and Mass of  $H_2$  with the Spitzer Infrared Spectrograph.* **Brunner, G.**, Sheth, K., Armus, L., Wolfire, M., Vogel, S.N., Helou, G., Dufour, R.J., Smith, J.D.T., and Dale, D.A. 2008. The Astrophysical Journal. 675, 316.

*Spitzer Finds Cosmic Neon's Sweet Spot.* Rubin, R., Simpson, J., Colgan, S., McNabb, I., Erickson, E., Haas, M., Citron, R., Dufour, D., **Brunner, G.**, Pauldrach, A. 16 May 2008.  
<http://www.spitzer.caltech.edu/Media/happenings/20080516/>

*Spitzer Observations of M33 and the Hot Star, HII Region Connection.* Rubin, R.H., Simpson, J. P., Colgan, S. W. J., Dufour, R. J., **Brunner, G.**, Ray, K. L., Erickson, E. F., Haas, M. R., Pauldrach, A. W. A., and Citron, R. I. 2008. The Monthly Notices of the Royal Astronomical Society. 387, 45.

## REFERENCES

Available upon request