

Curriculum Vitae Nathan Jennings

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Broad experience (17+ years), leadership, and management in business solutions development and implementation using a variety of geospatial technology and partnerships and collaborations. Highly skilled in all major GIS and Remote Sensing techniques and knowledge base. Significant programming experience in GIS and remote sensing algorithms using Python, C++, and VBA. Expert user/trainer for high-end GPS and field data collection protocols, methods, processing, and analysis.

Practical experience in government, private, non-profit, natural resource management, agriculture, emergency services, international organizations and projects.

The following highlights some of the primary abilities, skills, and knowledge. Additional information can be requested. See website for more details and portfolio of work.

Principal, Jennings Planet (2008-Present)

UC Davis (2010 – 2011)

Provide consultation and Python code development for a parasite model for a UC Davis researcher. Implements spatial and stochastic modeling, iteration, and raster development and management.

El Dorado Regional Fire (2008-2009)

Revised multi-county street centerline file for use in the computer aided dispatch software used by the regional fire district and other fire districts. Created data editing protocols for internal fire staff to provide on-going data maintenance for street data. Created a Flash Training demo as a deliverable to client that was used to train other regional partners. Custom Python development of data management tools.

UC Davis (2008-2009)

Created custom Python scripts to manage and process precipitation and temperature data throughout California for an epidemiology study. ArcGIS and Spatial Analyst Tools were used.

City of Sacramento (December 2004 – Present)

Sr. GIS Analyst

Consulting City Departments with GIS processes, protocols, and business systems integration and solutions. Leadership and management of staff and student interns.

Implementations

Department of Transportation

Street Sign Inventory – Street Signs and Markings Division

Create GIS field data collection using GPS and tablet PCs and back-end GIS data management, and integration with the Infor work order management system for a full street sign inventory (~150,000 assets). Create a scope of work for DOT to properly staff the data management and collection tasks of the sign inventory.

Urban Forest Inventory – Urban Forest Division

Collaborated to create a Request for Proposal to solicit an outside vendor to conduct the initial tree inventory throughout the entire City of Sacramento (~150,000 trees). Evaluated and selected vendor. Created a scope of work for the Urban Forest Services Department to provide appropriate GIS staff to maintain the tree inventory within the City. Primary lead for daily systems support for Urban Forest and development of cartographic products and routing.

Urban Forest Division is saving 50% in fuel costs and more effective management and dispatch of work crews.

Parking Space Inventory – Parking Division

Create and maintain enterprise parking space and lot database. Custom geocoding and data creation processes to place 45,000 parking spaces. Supervise student interns to perform daily tasks and maintenance on parking databases and map requests/products.

Pavement Management GIS Data Management - Advanced Planning Division

Develop workflow methodology to maintain and edit a pavement management database and integrate it into enterprise geodatabase. Trained staff to perform data management tasks.

Street Lights Inventory – Advanced Planning and Electrical Engineering Divisions

Develop and oversee the street light enterprise geodatabase. Lead business process and technical aspects of the street light inventory. Manage students and junior staff for data management tasks.

Survey Project and Benchmarks - Survey Division

Developed protocol for managing survey projects and benchmarks in CAD/GIS and Infor work order management system. Managed student interns to perform data management activities.

Department of Utilities

Solid Waste Division

Collaborate with developments of route boundaries for operations changes. Develop, Create, and Lead the creation of solid waste service routes and routing tasks. Develop and Create budget documents using statistics from RouteSmart GIS Routing software (add-on to ArcGIS). Provided support for commercial routing using ArcLogistics. Developed automated task to generate daily updated geospatial information for mapping and routing tasks.

Solid Waste Division management is able to provide optimized driving directions to solid waste drivers. Realized annual savings of \$2M/year.

Water Division

Evaluate mobile field data collection hardware and software for managing new water meter installations (~100,000 assets). Evaluated GPS, tablet PC, bar code scanners, and digital cameras. The GIS data is managed in ArcGIS and work orders are managed through City Works.

Develop and Create Field Data Collection protocols for water meters, valves, and other related water assets using existing successful implemented data collection strategies. Train and manage student interns and junior GIS staff and utility workers to implement field data collection protocols.

Code Enforcement Department

Rental Inspection Module – Developed and Created a semi-automated process to identify potential rental properties throughout the entire City of Sacramento for inspection and collection of rental inspection fees. The GIS data created is transferred to an outside vendor (CitizenServe) that hosts the web-based rental inspection module

used by Code Enforcement. Developed a geospatial ranking system to prioritize rental inspection activities on a 5 year cycle.

The Code Enforcement Department is able to effectively manage and summarize inspection tasks and analyze trends on a geospatial basis based on the methods and mapping functions described above.

Urban Search and Rescue (USAR)

Helped evaluate field technology and strategies for urban search and rescue teams. Currently evaluating GPS, field PCs, data collection strategies, communications between field and command posts, and training USAR staff and outside USAR teams that may be deployed to local search and rescue missions.

2006 Regional Image Collection

Leader for 2006 regional image collection (Included most of Sacramento County, West Sacramento, Davis, Woodland, Marysville and Yuba City, and urban areas in southeast Placer County). Helped develop the original RFP, RFP response and vendor evaluation, project lead that communicated with vendor, lead for technical review of imagery, and coordinated with Sacramento Area Council of Governments (SACOG) and other regional partners (Yolo County, Yuba County, Placer County, Sacramento County and municipalities, and USGS).

Emergency Operations Center (EOC)

Primary GIS staff member. Serve on a joint City/County Emergency Operations GIS team with the regional Emergency Operations Center is activated. Coordinate data organization and update, GIS Analyses, map production, communications with other operational areas of the EOC.

City University Trainer

Current instructor for GIS related courses to train City staff in mapping technology, resources, and GPS; created all course materials. Courses are taught once a month.

Student Intern Liaison

Serve as the primary student intern coordinator for the City of Sacramento for GIS and related positions throughout city divisions and departments. Manage, Mentor, Lead, and Oversee student interns.

Los Rios Community College District

(Fall 2003 – Present)

Adjunct Professor

American River College (2003-Present)

Introduction to Web GIS Development

- Introduced GIS-based map and geoprocessing service requirements
- Set up and administer a GIS based map server
- Students build and develop map functionality for a custom web GIS application

Introduction to Remote Sensing and Digital Image Processing

- Personally created this class in 2005
- Since 2007, the course is required to obtain a certificate and associate degree in GIS
- ERDAS Imagine, ENVI, OverWatch Feature Analyst, ArcGIS, Opticks (open source), WiscImage (University of Wisconsin-Madison)
- Won grant to supply course with ERDAS Imagine software

Intermediate GIS Programming (VBA and Python)

- Created a fully on-line version of this course since Spring 2010
- Fall 2010 intermediate course has been revised to be an introductory course, similar content and online
- Published [A Python Primer for ArcGIS](#) (2011). This text as the primary source for the course.

Introduction to Global Positioning Systems (GPS)

- Garmin and Trimble units
- Approximately half the class focuses Trimble and ArcGIS workflow for data collection and data management

Sacramento City College (2010-Present)

Introduction to GIS Software (ArcGIS)

- Fundamentals of ArcGIS, data management, editing, and cartography

Cosumnes River College (2003-2005)

Introduction to GIS Programming (VBA)

- Visual Basic for Applications using ArcGIS ArcObjects for geoprocessing

- ArcGIS customization

Jones & Stokes, Associates (2000-2004)

Sr. GIS/Remote Sensing Analyst

Project clients: PG&E (state wide), Federal agencies (see below), state and county governments, development companies

- Manage a wide variety of GIS/remote sensing tasks for natural resource management projects (proposals, scopes, budgets, logistics, technical work, written documents, presentations, deliverables)
- Perform complex spatial analyses, RDMS, and cartography related to biological assessment, planning, flora/fauna impacts, habitat (wetland/upland) mapping from small area (10s of acres) to large area (millions of acres), conservation plans, potential planting areas, opportunities/constraints analysis using ArcInfo, GRID, ArcGIS, ArcView for government agencies (USFS, BLM, USFWS, ACOE, and other state and federal agencies) and public/private utilities, land developers
- Mentor, supervise, and train staff in GIS and GPS operations, technical ability, and project progress using ESRI products (ArcInfo, ArcView, ArcGIS, Spatial Analyst, 3D Analyst, Avenue, RDMBS, VBA) and GPS (Trimble and Garmin, ArcPad, TerraSync)
- Oversee and manage GPS (Trimble and Garmin) use and assistance for staff
- Internal and external consultant for using GIS in a variety of natural resource management projects (biological assessment, habitat conservation plans, transportation plans, endangered species impacts, spatial modeling, etc).
- Primary contact for consulting on remote sensing (ERDAS Imagine) and GPS related technologies for projects (acquisition through project completion)
- Primary administrator for internal ArcIMS websites

Ducks Unlimited, Inc. (1997 – 2000)

GIS/Remote Sensing Analyst

- Manage large area land cover resource mapping projects in Alaska and northern Canada using satellite remote sensing (ERDAS Imagine) and GIS (ArcInfo, GRID, ArcView, Spatial Analyst, Avenue) for the Bureau of Land Management-Alaska, National Park Service, US Fish and Wildlife Service, and Ducks Unlimited-Canada (from inception to completion—budget, schedule, logistics, data acquisition, technical work, written reports, and digital/hardcopy deliverables)
- Supervise, mentor, and train staff in technical aspects of land cover mapping and digital image processing protocols
- Developed digital image processing (optical/radar) and GIS protocols for Ducks Unlimited and Ducks Unlimited-Canada staff. The Canadian projects were part of Ducks Unlimited's Boreal Forest Initiative.

- Primary lead on field work exercises in remote parts of Alaska and northwestern Canada (included helicopter reconnaissance, navigation, plant community identification, camping, and remote refueling)
- Maintained custom digital field form data entry program for land cover projects using Visual Basic, SQL, and Access. Also maintained the accuracy assessment program using Visual Basic.
- Served as technical liaison to project partners and Ducks Unlimited-Canada staff and Canadian partners
- GIS creating/analysis of ancillary data layers
- Created ArcView demonstrations showcasing land cover projects using Avenue and linking with 3rd party software for site records and digital site photos
- Programming—Avenue, AML, some Visual Basic, C++
- Peer reviewer for internal and external reports/protocols

Wisconsin Dept. of Natural Resources (1995 – 1997) Remote Sensing Analyst

- Digital image processing and wetland adjustment of National Wetland Inventory for statewide land cover survey (WISCLAND), Wisconsin Initiative for Statewide Cooperation on Land Cover Analysis and Data (following the WISCLAND Upper Midwest GAP Analysis Image Processing Protocol)
- Maintained Geoservices Section image archive and Arcview spatial database for imagery and methodology for digital orthophoto processing and archiving (ERDAS Imagine, Arc/Info)

M&M Mars, Inc. (Summers 1994-1995)

Research Assistant

- Developing MapInfo GIS applications for product distribution in Europe
- Develop digital image processing protocols for RADAR and multispectral satellite imagery to detect specific kinds of vegetation
- GIS analysis in support of the GIS applications
- Developed initial stages of a texture analysis software program using C++

Education

August 1993 – August 1996 University of Wisconsin-Madison Madison, WI

Master's of Science – Environmental Monitoring

- Thesis: *Using Landsat TM and ERS-1 Data for Analyzing Texture and Improving Land Cover Assessment*

Included a balance of coursework that included both GIS and remote sensing (air photo, satellite data, hyperspectral, radar). A required one year practical course included the

students to design, fund, perform all technical aspects (field work, GIS and remote sensing, digital image processing).

August 1988 - May 1993

Baylor University

Waco, TX

Bachelor of Arts – Biology

Coursework included a balance of plant science, animal science and a focus in environmental science courses

Kingwood High School, Kingwood, TX, 77339 May 1988

Publications and Presentations

NOTE: See my website for other documents I have created for college courses and technical user guides. <http://www.jenningsplanet.com/Training-and-Tutorials.87.0.html>.

Jennings, Nathan (2011). *A Python Primer for ArcGIS*. Self-published through CreateSpace.

Jennings, Nathan, Streithorst, K., Clarke, Trevor 2011. Opticks Open Source Remote Sensing and Image Processing Software, a Community College GIS Program, and Collaboration. FOSS4G Conference Proceedings, September 2011, Denver, CO.

Jennings, Nathan. ArcUser, Winter 2009. *Managing Street Sign Assets: An enterprise geospatial business systems integration solutions*.

Jennings, Nathan. *Remote Sensing, Digital Image Processing, and Field Data Collection*. Guest Lecturer, UC Davis Medical and Veterinary Center, May 2008.

Jennings, Nathan. *Management and Use of Digital Orthophotography, Pictometry, and LiDAR in the City of Sacramento*. URISA Fall NorCal Meeting. September 2007.

Jennings, Nathan. *Digital Elevation Models (DEM): Creating and Use in the Classroom*. CalGIS 2007. April 2007, Oakland.

Jennings, Nathan (1999). *Conducting Field Sampling for Large Area Satellite Remote Sensing Projects in Alaska*. 1999 ASPRS Conference, May 1999.

Jennings, Nathan, R. Macleod, J. Payne, and D. Kempka (1998). *Using ArcView to Demonstrate Natural Resource Management Projects*. ESRI User Conference, San Diego, CA. July 1998. **Written in HTML for use on the internet.

Jennings, Nathan and D. Feheringer (1998). Shrub Cutoff Delimma. In-house document analyzing spectral data in satellite imagery for different percentages of shrubs.

**Written inHTML so document could be viewed for public display.

Jennings, Nathan (1996). Thesis: *Using Landsat TM and ERS Data for Analyzing Texture and Improving Land Cover Assessment*. Master's Thesis, University of Wisconsin-Madison, pp. 169.

Environmental Monitoring Practicum (1995). *Natural Resource Management Using Remote Sensing and GIS in the Northern Chihuahuan Desert: Final Report*, University of Wisconsin-Madison, pp. 284.

Professional Membership

American Society of Photogrammetric Engineering and Remote Sensing (since 1994)

Related Experiences/Skills

Sacramento Region Student Chapter of the ASPRS – Charter leader, organizer, faculty advisor (2011 – Present).

GeoLeague Challenge 2012 – Faculty advisor. Challenge Topic: Enhancing the ability to inventory coastal wetlands.

Project Management Training

City Government Training (February 2005) by the Project Management Institute Braily and Associates. Project Management Training (2000) offered to Jones & Stokes

Hardware/Software

Systems: PC, DecAlpha, SunSparc

Hardware: Digitizers, 8mm/4mm, Travan tapes, CDROM, Trimble Explorer and XT/Rockwell/Garmin GPS, Epson/Kodak Digital cameras, scanners, slide scanners, HP Plotters

Operating Systems: Windows, Unix, Linux, DOS, OS2, Solaris

Software: ArcGIS (geodatabase), ArcSDE,, ArcPad, ENVI, ERDAS Imagine, Trimble GPS Analyst, ArcView 3.x, MapInfo, Idrisi, Pathfinder GPS Software, TerraSync, TopCon FAST, Waypoints + GPS Software, AutoCAD, TNTMips.

Open Source: Opticks (digital image processing/remote sensing), QGIS

Other Software: Microsoft Office Suite, Quattro Pro, Novaback, Digital camera software, Adobe, Outlook, SQL Anyware

GPS Hardware: Trimble, TopCon, Garmin, Magellen

Programming: Python, C and C++, AML, Avenue, script writing, ERDAS Spatial Modeler, Visual Basic for Applications using ArcObjects.

GIS Business Plan (2004) Jones & Stokes

Developed a GIS Business Plan (2004) to promote GIS throughout Jones & Stokes including marketing, improved communication both within GIS and throughout the organization structure within Jones & Stokes, increasing GIS staff, pursue new GIS-centric projects, and increase the potential to propose on more GIS-centric projects, and promote the use of existing and new GIS technologies such as remote sensing and web-based services.

The GIS Business plan was integrated into the 2004 Strategic Plan for Jones & Stokes.

Environmental Monitoring Practicum

Participated in a 2 semester practical course that involved a formal study for assessing land use and natural resources by the US Army at Ft. Bliss Army Base, El Paso, TX. This included using both GIS and remote sensing data to devise a working plan for improving how the Army allocated land for artillery and troop exercises as well as grazing and rangeland for cattle use. A final report was published, presented, and provided to the Army and Jornada Long Term Ecological Research (LTER) group.

Interests

Family, hiking/snow shoeing in the mountains, camping, water coloring, golf, traveling, reading, science, history