

# marek jakubowski

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## Qualifications

### Software

MATLAB, ENVI/IDL, ArcGIS, eCognition, Geospatial Modeling Environment, Global Mapper, WEKA data mining, Excel  
lastools, LP360, Quick Terrain Reader/Modeler, Fugro Viewer, PointVue, Google Earth  
Adobe InDesign, Illustrator, Photoshop, Lightroom, Flash, baslCColor display

### Languages

Python, shell scripting, JAVA, MATLAB, IDL, Javascript (D3), HTML, CSS  
Fluent in Polish

### OS

Windows, Mac OS, UNIX

## Experience: Design / data visualization related

### Art Director, *Berkeley Science Review*. Berkeley, CA (3/09 – 5/11)

Performed lead role in the design, layout, and print production of professional-level science magazine  
Created graphics to illustrate scientific concepts  
Art directed and executed photo shoots  
Hired, supervised, trained, and provided art direction for junior designers  
Coordinated with editorial staff, ad agency, and print press  
Made significant changes to the entire design, look, and feel of the magazine and its official logo

### Data visualization specialist, *Oakland Museum of California*. Oakland, CA (6/11 – 12/12)

Compiled DEM/bathymetry data for a large physical 3D CA model with visual data projection  
Prepared spatial GIS datasets for projected visualization  
Animated the formation of Sutter Buttes volcano range in California  
Prepared historic vegetation GIS data for gallery and web visualization

### Geospatial IT specialist / cartographer, *Deer Creek Resources*. Chico, CA (5/13 – present)

Senior scientist on a wetland vegetation mapping project: RS data analyses and visualization of the results  
Certified as Geographic Information System Specialist (GISS) by CalFire  
Deployed, staffed, and demobilized mobile GIS mapping trailers on wildfire incidents  
Designed and produced map atlases, large maps, and GIS products as requested on a 24-hour turnaround timeline  
Maintained computer hardware, network, plotters under non-negotiable deadlines  
Maintained cheerful and positive attitude under heavy, continuous workload

### Cartographer, *Little Sphaeroid Press*. Oakland, CA (9/12 – present)

Designed a series of maps for the book series *Mesembs: The Titanopsis Group* by Steven A. Hammer  
Found, cleaned, and edited GIS data of southern Africa for the maps  
Generated topographic shaded relief based on SRTM DEM data using ArcMap and Photoshop

### Cartographer, *Kickstarter project for Food: An Atlas*. Berkeley, CA (9/12 – 10/12)

Designed a map about community gardens in West Oakland, CA  
Map published and featured in a Kickstarter video, presentations, and press

### Graphics-related work during PhD, *University of California, Berkeley*. Berkeley, CA (9/06 – 1/13)

Designed, prepared, and printed programs and posters for the ESPM Gradfest Symposia 2011 & 2012  
Designed announcement posters and logo for the GIS@Berkeley program  
Compiled data from researchers and government agencies to create large physical maps for the SNAMP project

### Consultant / cartographer, *IHS Global Insight*. Oakland, CA (4/12)

Compiled and designed large maps for a stakeholder meeting about regional tourism marketing  
Created a large-format print-ready map on a rapid turnaround timeline

### Photography assistant, *Mark Estes Photography*. San Francisco, CA (2/11)

Assisted with on-location professional photo shoot

### Photography assistant, *Aliona Kuznetsova Photography*. San Francisco, CA (7/13)

Assisted with on-location fashion photo shoot

## Experience: Data analysis related

### **Remote sensing scientist, *InspecTools, LLC. Santa Cruz, CA (9/15 - present)***

Developed and executed Ecognition rulesets to delineate individual trees across California  
Processed large amount of stereo imagery-based 3D data to identify trees that pose threat to distribution power lines  
Analyzed stereo imagery and mobile lidar data to evaluate powerline tree encroachment  
Implemented algorithms for QA/QC and to prioritize results based on tree health and object shapes attributes  
The priority trees were inspected by ground crews

### **Fire-detection satellite design consultant, *FUEGO project at UC Berkeley. Berkeley, CA (1/12 - 4/13)***

Analyzed the feasibility of creating a fire-detection geosynchronous satellite sensor  
Compiled and analyzed MODIS, ASTER, and GOES satellite imagery to test fire-detection algorithms  
Prepared data visualization documents that illustrate the connectivity of researchers and analyses  
Patent pending for the satellite design and detection algorithm

### **Graduate student researcher, *University of California, Berkeley. Berkeley, CA (9/06 - 12/12)***

#### ***Individual tree segmentation using LiDAR Object-Based Image Analysis (OBIA) project:***

Compared individual tree delineation by a 3D lidar segmentation algorithm and eCognition  
Evaluated segmentation results from eCognition based on descriptive shape measurements  
Fused lidar and WorldView-2 data

#### ***Lidar density project:***

Simulated multiple-return, small-footprint lidar at multiple pulse densities  
Determined trends in accuracy of predicting common forest metrics as pulse density changes  
Analyzed lidar using artificial intelligence SVM algorithm, Gaussian processes, and multivariate regression

#### ***Fuel models and metrics project:***

Developed code to extract LiDAR point cloud metrics into TIFF, multi-band images (MATLAB)  
Predicted canopy and shrub structure metrics using machine learning algorithm  
Predicted fuel model input for fire behavior models using two artificial intelligence algorithms  
Developed software to automatically correct and georeference field data (Python)  
Developed protocol and collected LiDAR ground-truth for a large study area  
Spent two summers in mountainous forests collecting field data

### **Associate member of the technical staff, *The Aerospace Corporation. El Segundo, CA/Chantilly, VA (5/07 - 3/09)***

Developed algorithm to generate 3D environment from LiDAR, RS imagery, and on-ground photos  
Generated synthetic visible and midwave infrared imagery using DIRSIG  
Contributed to expansion of IDL hyperspectral target-detection program suite  
Participated in new sensor calibration mission and spectral measurement data collect  
Compiled a thorough survey of current passive and active sensors in all electromagnetic regimes  
Improved object-oriented IDL software suite used for sensors and data analyses

### **Principal researcher, *Digital Imaging and Remote Sensing Lab at RIT. Rochester, NY (5/05 - 5/06)***

MicroScene 2: High-resolution, hyperspectral synthetic scene generation project  
Incorporated field data in Digital Imaging and Remote Sensing Image Generator (DIRSIG)  
Validated DIRSIG simulations with hyperspectral, high-resolution imagery from COMPASS and WASP  
Supervised a group of interns and participated in ground-truth measurements campaigns  
Created CAD structures using Tree Pro and Rhino based on field data

### **Consultant / software developer, *LPA Systems, Inc. Fairport, NY (10/04 - 3/05)***

Helped to develop GIS/RS software for the Air Force Research Laboratory (AFRL)  
Developed and implemented image classifier (JAVA)  
Improved user experience (UX) of commercial software via source code  
Reported evaluation of gas plume detection research

### **Watershed research assistant, *Digital Imaging and Remote Sensing Lab at RIT. Rochester, NY (1/04 - 7/05)***

Processed, classified, and analyzed Landsat and various hyperspectral imagery  
Wrote IDL/ENVI program to correct striping in Hyperion data  
Performed change detection on aerial and satellite imagery  
Measured and collected bathymetry data using GPS-SONAR equipment

## Education

### University of California, Berkeley, 12/2012

*Environmental Science, Policy, and Management, PhD*

*Using airborne LiDAR in wildfire ecology of the California Sierra-Nevada forests*

Focus in lidar remote sensing (RS) and geographic information system (GIS)

### Rochester Institute of Technology, 5/2006

*Imaging Science, BS*

Focus in hyperspectral remote sensing

### Manhattan School of Music, 5/2002

*Piano Performance*

Numerous solo, chamber, and opera performances

## Coursework

### Data presentation / Design

Tufts's Presenting data & information course, Scientific Communication, Tone & color reproduction, Applied colorimetry, Making a magazine, Vision & psychophysics, Photography as an art form

### Quantitative

Computer science I-III, Spatial pattern recognition, System noise and random processes, Modern Physics, Analysis of Environmental Data, Quantitative Methods for Ecological Modeling

### Remote Sensing / GIS

Many classes in Advanced RS and in Advanced GIS, Photogrammetry, Cartographic principles, Digital Image Processing I-III

### Ecology

Resource ecology, Urban forestry, Environmental applications of RS, 3-day CNPS vegetation mapping workshop

## Publications

Pennypacker, C.R., **Marek K. Jakubowski**, M. Kelly, M. Lampton, C. Schmidt, S. Stephens, R. Tripp, 2013. "FUEGO—Fire Urgency Estimator in Geosynchronous Orbit—A proposed early-warning fire detection system," in *Remote Sensing*, 5(10):5173-5192.

**Marek K. Jakubowski**, W. Li, Q. Guo, M. Kelly, 2013. "Delineating individual trees from lidar data: A comparison of vector- and raster-based segmentation approaches," in *Remote Sensing*, 5(9):4163-4186.

**Marek K. Jakubowski**, Q. Guo, M. Kelly, 2013. "Tradeoffs between lidar pulse density and forest measurement accuracy," in *Remote Sensing of Environment*, 130(15):245-253.

**Marek K. Jakubowski**, Q. Guo, B. Collins, S. Stephens, M. Kelly, 2013. "Predicting surface fuel models and fuel metrics using lidar and CIR imagery in a dense, mountainous forest," in *Photogrammetric Engineering & Remote Sensing*, 79(1):37-49.

Li, W., Q. Guo, **Marek K. Jakubowski**, M. Kelly, 2012. "A new method for segmenting individual trees from the lidar point cloud," in *Photogrammetric Engineering & Remote Sensing*, 78(1):75-84.

Blanchard, S.D., **Marek K. Jakubowski**, M. Kelly, 2011. "Object-Based Image Analysis of downed logs in disturbed forested landscapes using lidar," in *Remote Sensing*, 3(11):2420-2439.

**Marek K. Jakubowski**, D. Pogorzala, T. J. Hattenberger, S. D. Brown, J. R. Schott, 2007. "Synthetic data generation of high resolution, hyperspectral data using DIRSIG," in *Imaging Spectrometry XII*, S. Shen and P. Lewis, eds., Proceedings of SPIE 6661OG.

## Presentations & Outreach

**Delineating Individual Trees: OBIA vs. 3-D using LiDAR.** Presented analyses and results to researchers and faculty during the OBIA Open Science Conference at Z\_GIS of the Salzburg University, Salzburg, Austria, 1/2014

**Sierra Nevada Adaptive Management Project (SNAMP) lidar workshop.** Prepared materials, videos, and data for an outreach workshop for the project's stakeholders, sponsors, and students, Oakhurst & Foresthill, CA, 5/2012

**Lidar pulse density in the Sierra Nevada: How low can you go?** Presented research results at the ESPM Graduate Research Symposium, Berkeley, CA, 5/2012

**Applications of LiDAR in fire ecology.** Research and Education in Wildland Fire Science (Prof Scott Stephens) laboratory meeting, Berkeley, CA, 4/2012

**Lidar in wildfire behavior modeling.** ASPRS Imaging and Geospatial Technologies Conference, Sacramento, CA, 3/2012

**My road to a PhD.** Presented research and steps taken to reach graduate school for the San Francisco University High School: Physics Guest Lecture Series, San Francisco, CA, 3/2011

**Introduction to LiDAR applications in remote sensing.** Designed and led workshop for Geospatial Innovation Facility, Berkeley, CA, 1/2010

**Geospatial theory, GIS, and GPS.** Designed and led GIS/GPS workshop for the Youth Employment Partnership program for low-income students, Berkeley, CA, 7/2010

**LiDAR theory and analysis with laboratory exercises.** Guest lecturer in Applications of Remote Sensing Seminar, UC Berkeley, Berkeley, CA, 5/2009

**Differential GPS in scientific research.** Presented and discussed how to collect DGPS data in a heavily forested field campaign at University of California, Merced in Merced, CA, 8/2008

**Synthetic data generation of high resolution, hyperspectral data using DIRSIG.** SPIE Imaging Spectrometry XII Conference, San Diego, CA, 8/2007

**Comparison of OBIA software.** Designed and led computer workshop for the Object Based Image Analysis Symposium, Berkeley, CA, 4/2007

**Hyperspectral vs. multispectral imagery in Object-Based Image Analysis (OBIA).** AVIRIS Science Workshop, JPL, Pasadena, CA, 6/2007

**Assessing OBIA-based vegetation classification using AVIRIS data.** Association of American Geographers conference, San Francisco, CA, 4/2007

**Microscene 2: high spatial resolution, hyperspectral data synthesis.** Digital Imaging and Remote Sensing Laboratory Scientists Meeting, Rochester, NY, 5/2006

## Awards

ASPRS ERDAS Award for Best Scientific Paper in Remote Sensing (first place), 2014

Best Design award for the Berkeley Science Review, UC Berkeley ASUC, 2011

Berkeley Circus Studio Award for *Photography as an Art Form*, 2011

ASPRS student of the year award (first place), 2006

Lang scholarship, Rochester Institute of Technology, 2006

Boeing scholarship award, 2004