#### **Duties** Tasks A2 Document A3 Write A4 Define methodology & A5 Define area A6 Evaluate A8 A1 Clarify A7 Select appropriate data type Manage Projects based on platform/resolution project scope / funding workflow (classification scheme) & time period of project scope / environmental avai Α objectives with objectives conditions (spectral, spatial, radiometric, proposals interest imag client temporal) web **B3** Select B5 Download / B1 Search web-**B2** Select B4 Contract image acquisition with B6 Create data / Acquire Data file structure based image appropriate data appropriate remote sensing data providers decompress files B providers output format C1 Inventory C2 Design C3 Develop field logistics (people, C4 Conduct C5 Collect training & accuracy data C6 Organize & C7 Collect ground contr Validate & Ground local knowledge validation rapid in-situ equipment, permissions) (field or sensor based) archive imagery registration С **Truth Data** of study area sampling plan / validation data reconnaissance methods D2 Subset image D3 Perform D4 Perform D5 Perform D6 Ortho-rectify D7Georeference D8 Assess D10 D1 Mosaic D9 Pan sharpen **Prepare Data** projection/datum radiometric atmospheric image / data image / data image / data / data image / data positional imag D transformation correction correction accuracy (RMS) D14 Correct D15 Mask D16 Enhance D17 Convert D18 Convert D19 Identify Prepare Data (con't) image defects unnecessary image contrast vectors to rasters rasters to vectors appropriate band D combinations for features display E2 Conduct E3 Determine E5 Define E8 ( E1 Filter image E4 Perform E6 Perform supervised classification E7 Perform unsupervised Extract Information (edge visual classification heads-up spectral (single or multi-date image) classification (single or multi-date spec F enhancement, interpretation scheme digitizing signatures for image) clas smoothing) classification E16 E12 Conduct E13 Perform E10 Transform images (PCA. E11 Conduct sub-pixel classification E14 Perform E15 Perform **Extract Information** vegetation indices, band ratios) (spectral mixture analysis) decision tree object-based image neural network class F (con't) classification image analysis segmentation classification (cha itera E19 Develop **Extract Information** batch processing E (con't) scripts F1 Perform F2 Compare F3 Create F4 Evaluate classification accuracy F5 Compare F6 Compare image geometry with Assess Accuracy validation data confusion matrix (user, producers, overall / kappa) classification ground control to assure spatial regression F with analysis (contingency accuracy with accuracy. classification table) standards G8 Print large G9 G1 Recode / G2 Reduce noise G3 Quantify results (class statistics, G4 Create charts G5 Create tables G6 Create G7 Design maps **Develop End** reclassify image in classification landscape metrics) scientific reports format maps meta G **Products** G13 Prepare **Develop End** presentations G **Products (con't)** H6 Produce H1 Conduct H2 Publish H3 Conduct H5 Produce H7 Attend on-H8 Read H9 Participate in H10 H4 Participate in **Pursue Professional** presentations journal articles workshops workshops outreach training line courses technical articles conferences field Η **Development &** materials materials (podcast / appl Outreach (brochures etc.) webinars) H14 Mentor H15 Participate Pursue Professiona others in review panels Development & Η (on-line & in-**Outreach** (con't) person)

## **DACUM Research Chart for Remote Sensing Specialist**

			-
Inventory ilable gery using resources	A9 Create project budget (staffing, cost factor, timeline, site visit)		A10 Monitor schedule and budget
rol points for	C8 Collect spectra imagery classificat		
) Resample ge / data	D11 Import image / data	D12 Reformat image / data type	D13 Combine image /data layers
Convert unsupervised classes for ctral signatures for hybrid sification		E9 Evaluate & modify spectral signatures based on separability for classification	
5 Refine ssification ange inputs, ate)	E17 Perform time series analysis	E18 Conduct image subtraction (single bands or image transforms)	
Compile adata	G10 Export data (multiple formats)	G11 Share data (web-FTP)	G12 Create animations
) Research ds of lication	H11 Conduct community outreach	H12 Acquire professional certifications	H13 Pursue advanced degrees

### **General Knowledge**

Application specific knowledge (forestry, agriculture, natural resources, geography, geology) Cartography Data/software licensing Datum transformations Familiarization with remote sensing data resources Geodesy GIS technology GPS technology Histograms History of study site Information technology (IT) Managing very large data sets Map projections Measurement space (spectral) Natural history of study site Principles of sensor design for RS Probability Radiometric physics (principles for RS) Software Software & hardware management Spectral signatures (reflectance) **Statistics** 

#### Skills

Analytical Communication Design Detective File management Information Technology (IT) Math Navigating graphical user interface Organizational Presentation Problem solving Spatial aptitude Visual interpretation Writing

#### **Worker Behaviors**

Attention to detail Creativity Focused Innovative Jack of all trades Multi-tasking Open-minded Patience Risk taker Take charge attitude Take initiative Teachable Tech savvy Tenacity Trouble shooter Willingness to learn Work independently

#### **Tools, Equipment, Supplies and Materials**

Aerial photographs **Binoculars** Camera Clinometer Clipboards Compass Densiometer Desktop computer **Digital Elevation Models** (DEMs) Digital images Fisheye lens Flagging tape Frag Stats / Patch Analyst GIS software **GPS** receivers Image processing software Laptop computer Large format color printer Laser range finder Leaf Area Index (LAI) 2000 Manuals & books Measuring tape Personal Digital Assistant (PDA) Printer (small format color) Sensor platforms Sensors Server Spectrometers Stereoscopes Topographic maps Tree diameter tape Vehicle (4-wheel drive)

#### **Future Trends and Concerns**

Growing emphasis on object based image analysis Growing use of virtual globes & cities Higher temporal frequency for image data Increasing of usability of remote sensing data More active sensors More Lidar More variable data pool Rapidly declining costs Three-dimensional image creation

# **DACUM Research Chart for Remote Sensing Specialist**

## **DACUM Panel**

Charles Clancy, GIS/Remote Sensing & Geodesy Analyst, Chevron Energy Technology Company, San Ramon, CA Lawrence Fox III. Emeritus Professor and Senior Advisor, Institute for Spatial Analysis, Humboldt State University, Arcata. CA Kevin Koy, Manager, Geospatial Innovation Facility, U.C. Berkeley, Berkeley CA Laura E. P. Rocchio, Senior Outreach Scientist, Science Systems Applications Inc., Los Angeles, CA Cindy Schmidt, Research Scientist, San Jose State Foundation/NASA. NASA Ames Research Center, Moffett Field, CA

## **DACUM Facilitators**

John Johnson, Facilitator Chris Lewis, Recorder Chris Cruz, West Valley College, Recorder



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