

## **Student Research.**

General philosophy: I try to work with students to craft a project that best suits the student's goals and what they like to do, within the limitations of my expertise and funding. My main areas of interests are active plate margin tectonics, both ancient and modern, and I apply a number of different geologic threads to address tectonic problems including structural geology, metamorphic petrology, geochronology, sedimentary petrology and stratigraphy, and geomorphology. All of my masters projects and many of my senior projects have a field mapping component because I believe that such mapping is fundamental to good geologic research and (perhaps most importantly) because I believe students do not get enough field mapping experience today. Accordingly, I believe that giving students additional advanced field mapping experience will serve them well, regardless of whether they go directly into the professional ranks (where field experience is the no.1 most valued skill along with writing skills) or whether they go on to do PhD studies in another department. I also try to design masters projects so that my students have a good chance to publish at least one first-authored peer-reviewed paper from their thesis research. Senior projects are designed with the potential for a student to present their findings at a GSA and AGU meeting.

My general interest areas in “basement geology” include the relationship between metamorphic P-T-t paths and tectonic process, processes of subduction and accretion (including mélangé generation), the rock record of subduction initiation and termination, ophiolite generation and emplacement, and orogenic belt assembly. Specific areas of interest are the Franciscan Complex of coastal California and various metamorphic and ophiolitic units of the central and northern Sierra Nevada. In the neotectonics and tectonic-geomorphology realm, I have a general interest in strike-slip fault system evolution on all scales, with particular interest in step-over evolution as well as a specific interest in the landscape evolution of the Sierra Nevada and California Coast Ranges. Specific areas of research in strike-slip fault system evolution are the northern San Andreas fault system and the Walker Lane-Eastern California shear zone.

### **List of Ongoing and Past Masters Projects.**

Jennifer Ratliff (in progress). Serpentinite, shale, and sandstone matrix mélanges, Permanente terrane, Franciscan Complex, Calero Reservoir area, California.

Yvan Mendoza (in progress). High and low grade metamorphic rocks of the Shoo Fly Complex, Mokelumne River drainage, central Sierra Nevada, California: Collisional metamorphic signature?

Andy Shriver (in progress). Landscape evolution, related tectonics, and comparative efficacy of glacial versus fluvial erosion, American and Yuba River drainages, Sierra Nevada, CA

Dennis Eck (in progress). The Devils Gate ophiolite, northern Sierra Nevada, California: Not an ophiolite or metamorphic sole?

Maya Hildebrand Garcia (in progress): Sierra City mélangé, Shoo Fly Complex, northern Sierra Nevada, near Quincy, California: The oldest ophiolitic suture in the Sierra Nevada?

Nobuaki Masutsubo (M.S. 2013) Diverse metamorphic trajectories, imbricated ocean plate stratigraphy, and fault rocks, Feather River ultramafic belt, Yuba Rivers area, California.

Jennifer Jackson (M.S. 2012) Southern extension of the Feather River ultramafic belt, central Sierra Nevada, California: Evidence for along-strike variation of basement units in an orogenic belt.

Chris Kemp. (M.S. 2012) Tectonic and geomorphic evolution of the northern Sierra Nevada, California.

Emily Davis. (M.S. 2010) Tectonic inversion related to paired migrating bends and step-overs: A structural and geomorphologic analysis of the Fish Lake Valley Area, California-Nevada.

Chris Smart (M.S. 2008). Structural and metamorphic evolution of a metamorphic sole, western border Feather River ultramafic belt, North Fork Feather River Canyon, CA. Winner of Best Thesis Award, California State Fresno for academic year 2008-2009.

### **Selected Ongoing and Past Senior Projects**

Steffany Aguilar-Loeb (ongoing). Great Valley Group or Franciscan mélanges, eastern San Jose, California

Kevin Loeb (ongoing). Investigation of fault zones in Coast Range ophiolite gabbro, Hayward Hills, California.

Joshua Marroquin (ongoing). Geochemistry of graywacke and large graywacke clasts, Franciscan Complex, San Francisco Bay Area, California.

John Tanner (2013). Field relationships of inset late Cenozoic volcanic rocks, South Fork Kings Canyon, California.

Yvan Mendoza (2010). PT conditions of metamorphism, Shoo Fly Complex, northern Mokelumne River area, CA.

Rachel Prohoroff (2010). Structural relationships of mélanges and intra-Franciscan serpentinite, western Marin County, CA.

Brian Hitz (2009) Mélanges involving Franciscan, Great Valley Group, and Coast Range ophiolite, Hayward Hills, CA.

Joey Luce (2009): Eclogites of the Sierra Nevada?

Jared Long (2009). High-grade Franciscan rocks west of the Salinian block, CA

Chad Carlson (2009). Field relations and age of late Cenozoic volcanic unit, mid-upper San Joaquin River drainage, CA

Barbara "Bo" Jessup (2009). Geology and metamorphism of part of the Franciscan core of Mt. Diablo, California.

### **Student Publications and Abstracts**

Publications and Abstracts of student advisees (one asterisk denotes masters student at Fresno State, two asterisks denoted undergraduate at Fresno State at time of research, three asterisks denotes PhD student at UC Berkeley, four asterisks, co-advised Ph.D. student with Chinese Academy of Sciences, Beijing).

### **Publications**

Shimabukuro\*\*\*, D.H., Wakabayashi, J., Alvarez, W., and Chang, S.-c., 2012, Cold and old: The rock record of subduction initiation beneath a continental margin, Calabria, southern Italy. *Lithosphere*, v. 4, p. 524-532.

Prohoroff\*\*, R.E., Wakabayashi, J., and Dumitru, T.A., 2012, Sandstone-matrix olistostrome deposited on intra-subduction complex serpentinite, Franciscan Complex, western Marin County, California: *Tectonophysics* v. 568-569, p. 296-305. doi: 10.1016/j.tecto.2012.05.018

Hitz\*\*, B., and Wakabayashi, J., 2012, Unmetamorphosed sedimentary mélangé with high-pressure metamorphic blocks in a nascent forearc basin setting: *Tectonophysics*. v. 568-569, p. 124-134. doi: 10.1016/j.tecto.2011.12.006

Smart\*, C.M., and Wakabayashi, J., 2009, Hot and deep: Rock record of subduction initiation and exhumation of high-temperature, high-pressure metamorphic rocks, Feather River ultramafic belt, California: *Lithos*, v. 113, p. 292-305, doi:10.1016/j.lithos.2009.06.012

### **Abstracts and Presentations (oral or poster presentation noted)**

Carlson, C.W.\* and Wakabayashi, J., 2013 (poster), One versus two late Cenozoic uplift events, Sierra Nevada, California, recorded in drainage geomorphology: *Geological Society of America Abstracts with Programs*, v. 45, no. 6, p.17

Luo, J.\*\*\*\*, and Wakabayashi, J., 2013 (poster), An upper crustal ophiolite remnant within the Feather River ultramafic belt, northern Sierra Nevada California: Unsubducted, but affected by ridge subduction? *Geological Society of America Abstracts with Programs*, v. 45, no. 6, p. 72

Masutsubo, N.\*, and Wakabayashi, J., 2013 (poster), Diverse metamorphic trajectories, imbricated ocean plate stratigraphy, and fault rocks, Yuba River area, Feather River ultramafic belt, California: *Geological Society of America Abstracts with Programs*, v. 45, no. 6, p. 72

Eck, D.S.\*, and Wakabayashi, J., 2013 (poster), The Devils Gate ophiolite, northern Sierra Nevada: Not an ophiolite or metamorphic sole? *Geological Society of America Abstracts with Programs*, v. 45, no. 6, p.72

Shimabukuro, D.H.\*\*\*, Alvarez, W., Wakabayashi, J., and Moores, E.M., 2013 (oral), An oceanic core complex preserved in ophiolitic fragments in Calabria, southern Italy: *Geological Society of America Abstracts with Programs*, v. 45, no. 6, p.55

Masutsubo, N.\*, and Wakabayashi, J., 2011 (poster), Complex temporal-spatial relationships, Feather River ultramafic belt, northern Sierra Nevada. *EOS Fall Meeting Supplement Abstracts*

Jackson, J.L.\*, Wakabayashi, J., and Jackson, B.A., 2011 (poster), Southern continuation of high-grade metamorphic rocks of the Feather River ultramafic belt, California: Preliminary reconnaissance. *EOS Fall Meeting Supplement Abstracts*

Prohoroff, R.E.\*\*, Wakabayashi, J., and Dumitru, T., 2011 (poster), Sandstone matrix olistostrome deposited on intra-subduction complex serpentinite, trench slope basin deposits, and nappe and fold

- architecture and chronology, Franciscan Complex, Marin County, California. EOS Fall Meeting Supplement Abstracts
- Masutsubo, N.\*, and Wakabayashi, J. 2010 (poster), Amphibolite and blueschist facies metamorphism, Feather River ultramafic belt, Yuba River drainage: A record of subduction initiation, ridge subduction, and continued subduction? Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 479
- Mendoza, Y.\*\*\*, and Wakabayashi, J., 2010 (poster), Collisional metamorphic signature in the Sierra Nevada, California? High-grade metamorphism of the Shoo Fly Complex: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 479
- Shimabukuro, D.H.\*\*\*, Wakabayashi, J., Alvarez, W., and Chang, S.-c., 2010 (oral), Possible cold subduction initiation beneath a continental margin in Calabria, southern Italy: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 678
- Prohoroff, R.E.\*\*\*, and Wakabayashi, J., 2010 (oral), Order within the chaotic: Franciscan Complex field relations show km-scale overturned folds, an olistostrom deposited on intra-Franciscan serpentinite, and more: Geological Society of America Abstracts with Programs, v. 42, no. 5 p.35
- Kemp, C.\*, and Wakabayashi, J., 2009 (oral), Late Cenozoic uplift and associated landscape evolution of the Sierra Nevada, California: Geological Society of America Abstracts with Programs, v. 41, no.7 p. 180
- Carlson, C.\*\*\*, Wakabayashi, J., and Pluhar, C., 2009 (poster), Field relations and age of late Cenozoic volcanic units inset within the mid-upper San Joaquin River drainage, CA: Geological Society of America Abstracts with Programs, v. 41, no.7, p . 293
- Shriver, A.\*, and Wakabayashi, J., 2009 (poster), Landscape evolution of the northern Sierra Nevada, USA: Insights from the American River drainage: Geological Society of America Abstracts with Programs, v. 41, no.7, p .293
- Shriver, A.\*, 2009 (poster), A river runs through it: Modeling and mapping flood inundation in Yosemite Valley, Yosemite National Park (USA): Geological Society of America Abstracts with Programs, v. 41, no.7, p.289
- Luce, J.\*\*\*, and Wakabayashi, J., 2009 (oral), Revisiting the lone Sierra Nevada eclogite locality: What IS it?: Geological Society of America Abstracts with Programs, v. 41, no. 7, p.404
- Long, J.\*\*\*, and Wakabayashi, J., 2009 (oral), High-P amphibolite blocks from mélangé, Nacimiento belt, coastal California: A first report: Geological Society of America Abstracts with Programs, v. 41, no.7, p. 403
- Masutsubo, N.\*, and Wakabayashi, J., 2009 (oral), Beyond simple models of orogenic metamorphism: HP/HT, LP/HT, and HP/LT metamorphism, Feather River ultramafic belt, North Yuba River canyon, California: Geological Society of America Abstracts with Programs, v. 41, no.7, p .519
- Annis, D.\*, and Wakabayashi, J., 2009 (oral), HP/HT metamorphism of the Devil's Gate ophiolite, Sierra Nevada, California: Where is the upper plate?: Geological Society of America Abstracts with Programs, v. 41, no.7, p. 404
- Hitz, B.\*\*\*, and Wakabayashi, J., 2009 (oral), Franciscan shear zones between Coast Range ophiolite and Great Valley Group rocks: Evidence of mélangé diapirism? Geological Society of America Abstracts with Programs, v. 41, no.7, p.404
- Shimabukuro, D\*\*\*, Wakabayashi, J., Libera, F., Piluso, E., and Alvarez, W., 2009, Applying the Franciscan model to a non-collisional Alpine segment in the Calabrian orogen of southern Italy: Geological Society of America Abstracts with Programs, v. 41, no.7, p. 403
- Kemp, C.\*, and Wakabayashi, J., 2009 (oral), Sierra Nevada frontal fault system: Kinematics and associated landscape evolution: Geological Society of America Abstracts with Programs, v. 41, no.5, p.31.
- Kemp\*, C., and Wakabayashi, J., 2008 (poster), Temporal slip variation of the Sierra Nevada frontal fault system and effects on landscape evolution: EOS (2008 AGU Fall Meeting abstracts)

- Smart\*, C., and Wakabayashi, J., 2008 (oral), Hot and deep: Rock record of subduction initiation, Feather River ultramafic belt, California: Geological Society of America Abstracts with programs, v. 40, no.6, p. 514-515
- Wakabayashi, J., and Smart\*, C., 2008, The rate of SW Pacific Cenozoic tectonic transitions compared to models of North American Cordilleran tectonics: Are the latter too simplistic? Geological Society of America Abstracts with programs, v. 40, no.6, p.514.