**Project Title:** Geological Constraints on ~25 Million Years of Magmatism Along an Arc-transform Junction, Wrangell Volcanic Belt, Alaska  
**Principle Investigator:** Dr. Jeffrey Trop, Professor of Geology  
**Funding Agency:** National Science Foundation (NSF)  
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The Wrangell volcanic belt in southern Alaska is situated in a complex tectonic environment where an oceanic plateau (the Yakutat block) is presently colliding with and subducting beneath Alaska at a very low angle. To the east, a large transform fault system, the Denali fault, bounds the edge of this subducting plateau and a major volcanic chain, the Wrangell volcanic belt that has been built up over the last 25 million years, marks this intersection. Such junctions are common in modern convergent margin settings and the resulting volcanic belts record both variations in relative position of the leading front of the slab and translation of the upper plate along strike-slip faults. The processes that generate lavas in these complex settings are poorly understood. Here, this research team aims to decipher the origins of the volcanic rocks in the Wrangell volcanic belt through a comprehensive study of the geology, volcanic rock chemical composition, and geochronology of the belt. The results would provide a new understanding of how volcanic chains develop in such complex tectonic settings. The project also benefits society or advances desired societal outcomes through: (1) planned involvement of students from underrepresented minorities in STEM; (2) increased public scientific literacy and public engagement with science and technology through presentations in local communities and development of interpretive materials for the Wrangell-St. Elias National Park and Preserve; and (3) development of a STEM workforce through training of graduate and undergraduate students and support of early career researchers.

This project examines the geochemical-eruptive evolution of an under-sampled 25 Ma arc-transform magmatic belt, the Wrangell volcanic belt in Alaska. The belt is transected by a major strike-slip fault, the Denali fault system, and located above both the edge and leading front of the Yakutat flat slab. The researchers will collect bedrock, detrital sand/cobbles samples, and sedimentological and structural data from the Wrangell volcanic belt. They will determine major and trace element composition, whole rock Sr, Nd, Pb, and Hf, and zircon Hf-isotope concentrations, and 40Ar/39Ar and U/Pb geochronology on bedrock and detrital samples. Specific objectives of the project are to: (1) determine the temporal-spatial history of magmatism of the Wrangell volcanic belt; and (2) decipher the links between strike-slip faulting, and slab melting on the geochemical evolution of this slab edge volcanic belt. These data will be integrated with geological mapping to provide important new constraints on the development of
slab edge magmatism along an arc-transform junction as the leading front of the flat slab progresses inboard and the relationship between strike-slip faults and the geochemistry of magmatic products.

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