**A Data-Driven Approach for Characterization of Ternary Al(fcc)-Al$_2$Cu(tet)-Ag$_2$Al(hcp) Eutectic Alloys** IRMAK SARGIN, SCOTT BECKMAN, Washington State Univ — We present a new data-driven approach to characterize the microstructure of the ternary eutectic Al-Ag$_2$Al-Al$_2$Cu alloy. In this approach a range of microstructural descriptors are developed and used within the PCA and PLSR analysis methods. The similarity between the ideal microstructures and those experimentally obtained are quantified and the percentage similarity to ideal structures is used as a new means for cataloguing microstructures. This quantified comparison of the idealized structures to the experimental ones provides insight about the microstructural evolution. Such an approach can be applied to many different areas of materials science allowing the important relationships between microstructure and physical properties to be identified. This form of analysis allows determination of which deviations from the ideal attributes result in variation from the ideal physical properties.

Irmak Sargin
Washington State Univ

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