



Exponent[®]

Engineering & Scientific Consulting

Nevin Taylor, Ph.D.

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Professional Profile

Dr. Taylor is a materials engineer with expertise in metallurgy, alloy development, materials processing, characterization of materials, and additive manufacturing. He specializes in microstructure-property relationships in metallic systems, and has extensive experience working with titanium alloys for aerospace and biomedical applications.

Dr. Taylor has developed a wide range of experience with characterization, failure analysis, analytical testing, and mechanical testing. This includes characterization in the form of scanning electron microscopy (SEM), electron backscatter diffraction (EBSD), energy dispersive X-ray spectroscopy (EDS), focused ion beam (FIB) milling, and scanning transmission electron microscopy (STEM). This work has helped inform relationships between failure modes, microstructure, and mechanical properties. Dr. Taylor has worked hands-on with manufacturing techniques varying in scale from arc melting and induction melting to large-scale structural castings. He has also worked in a manufacturing environment as a quality/process improvement engineer in a titanium manufacturing plant.

Prior to joining Exponent, Dr. Taylor earned his Ph.D. from The Ohio State University. There, his research focused on developing new titanium alloys for additive manufacturing applications, which take advantage of the inherently different processing conditions as compared to conventional manufacturing. Dr. Taylor gained hands-on experience with various additive manufacturing techniques including powder-blown, powder-bed, and wire arc additive manufacturing to develop customized alloys with locally controlled chemical composition. Dr. Taylor conducted extensive studies on the relationships between heat treatments, alloy composition, microstructure, and mechanical properties to create the next generation of additive manufactured parts used in aerospace.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, The Ohio State University, 2022

B.S., Applied Science, University of British Columbia, 2017

Professional Affiliations

The Minerals, Metals and Materials Society (TMS) Member

Publications

Mohan, N., Welk, B., Mantri, S., Taylor, N., Viswanathan, G., Dahotre, N., Banerjee, R., Fraser, H. "Underlying Factors Determining Grain Morphologies in High-Strength Titanium Alloys Processed by Additive Manufacturing", *Nature Communications* (2023), 14

Veghte, D., Welk, B., Taylor, N., Fraser, H. "Microstructure Change of an Additively Manufactured High-Strength Titanium Alloy Over Large Areas Using Mapping and EBSD", *Microscopy and Microanalysis*, (2022), 28

Welk, B., Taylor, N., Kloenne, Z., Chaput, K., Fox, S., Fraser, H. "Use of Alloying to Effect an Equiaxed Microstructure in Additive Manufacturing and Subsequent Heat Treatment of High-Strength Titanium Alloys", *Metallurgical and Materials Transactions A*, (2021), 52

Presentations

Fraser, H., Taylor, N., Welk B., Kloenne Z. "Invited – Developing New Metastable Beta-Titanium Alloys and Optimizing Their Properties through Heat Treatments", TMS 2022, Anaheim, CA 2022

Taylor, N. "Development of Equiaxed Titanium Alloys in Additive Manufacturing" Poster presentation, TMS 2022, Anaheim, CA 2022.

Taylor, N., Welk, B., Kloenne, Z., Baker, A., Fraser, H. "Development of New Ti-64 Modified Alloys for Additive Manufacturing with Columnar to Equiaxed Transition", TMS 2020, San Diego, CA, 2020.