Guidewire Performance by Material, Process & Form

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Guidewire performance is not dictated by alloy selection alone. Material composition, thermomechanical processing, and wire form provide a vast outcome space across stiffness, strength, superelasticity, fatigue resistance, radiopacity, and other application-specific desiderata. This presentation explores these three design levers through examples relevant to vascular access wire applications. Material examples include binary NiTi and alternative alloys such as NiTiNb and NiTiPt. Process examples illustrate the broad range of properties achievable from a given alloy through processing and highlight some potential performance tradeoffs. Form expands the design space through wire geometry, shaped profiles, and other advanced architectures. Together, these approaches enable material solutions tailored to component-level performance.

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Jeremy leads a materials innovation group at Fort Wayne Metals, which drives fundamental research and new product development in medical device and aerospace markets. The team's burgeoning portfolio includes moonshots, as for example, orthopedic "vitamin" metals and "nitinol wool" and incremental advances such as high temperature SMA for actuators, and MRI-friendly alloy development for evolving surgical theaters, as well as many collaborative publications and patents. Jeremy holds degrees in Mechanical Engineering, Materials Science, and Biomedical Engineering from Purdue University.

