

MRS Bulletin

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The machine learning revolution in materials research

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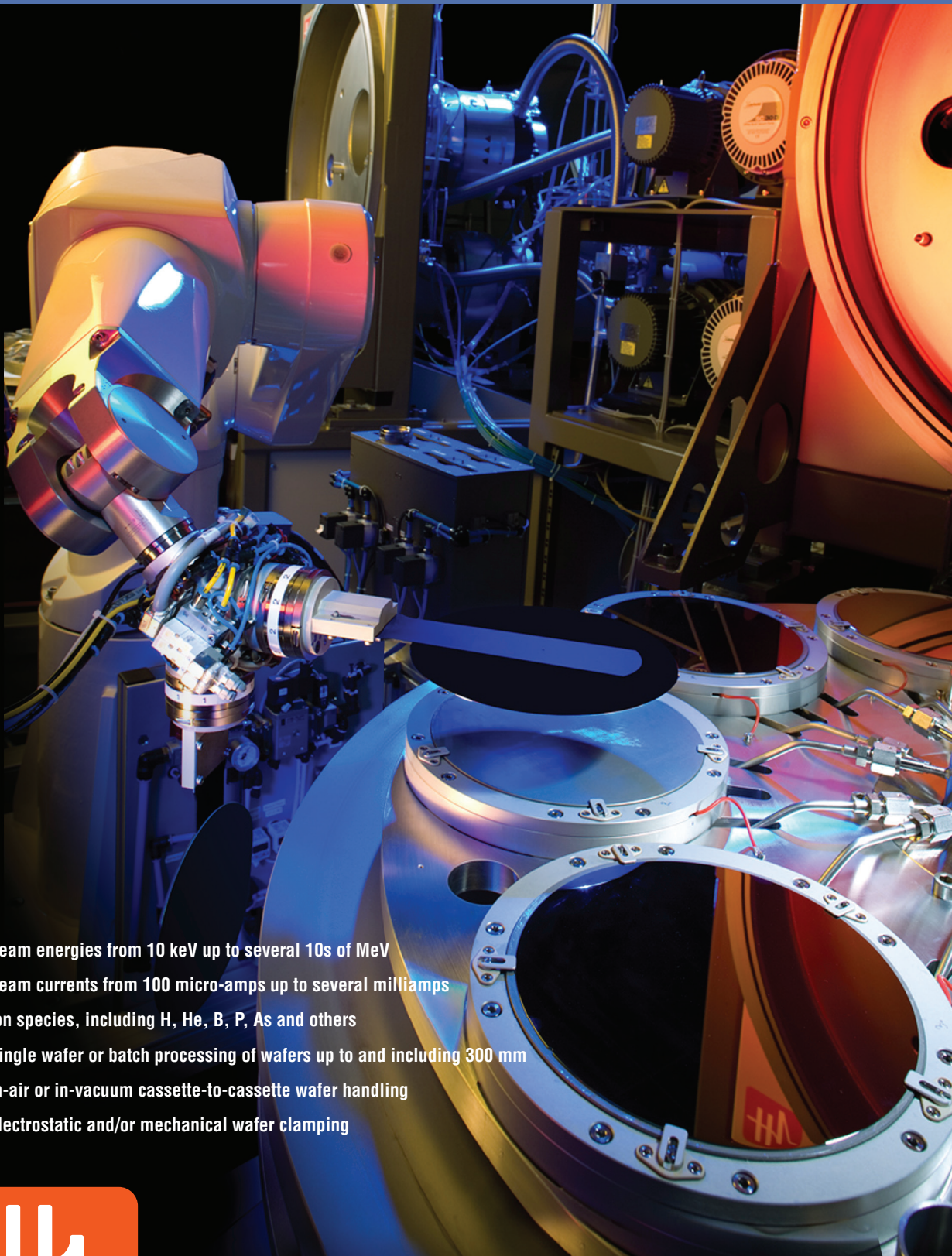
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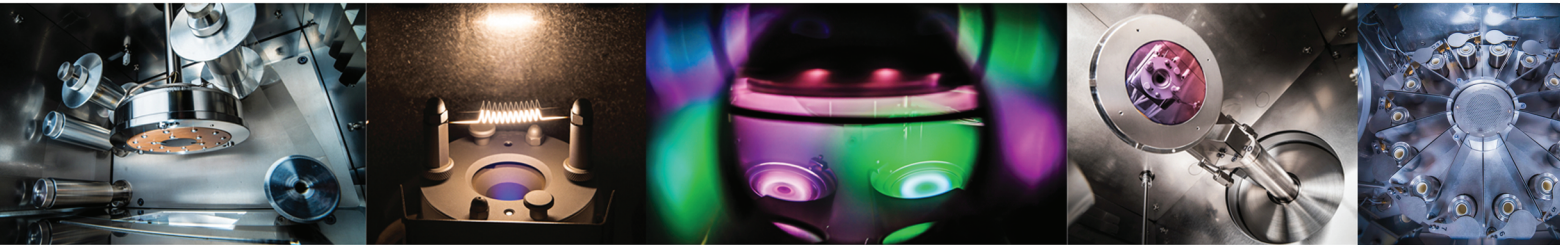
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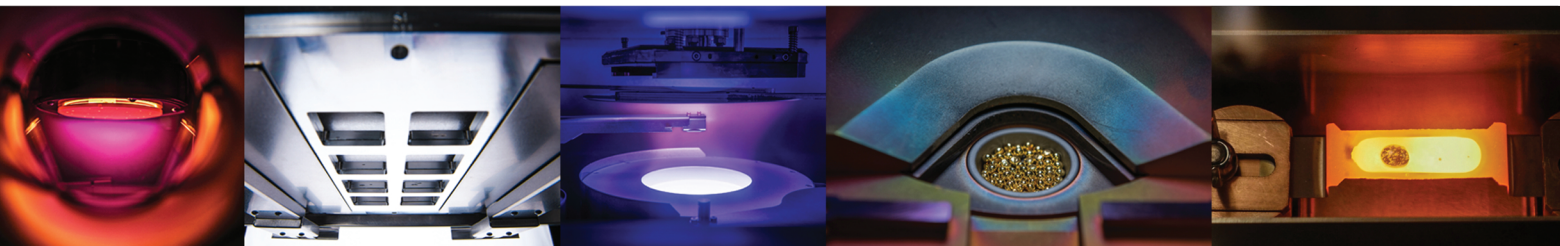
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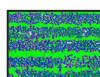
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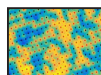


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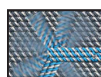
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ON THE COVER

The machine learning revolution in materials research. Machine learning (ML) and artificial intelligence (AI) applications are rapidly changing materials research. This issue of *MRS Bulletin* highlights how ML and AI are being used to accelerate contemporary materials research beyond more classical data-analysis workflows. This has resulted in faster materials design and discovery, faster computational models, autonomous and intelligent "robot researchers," and automated discovery of physical models. The cover shows the Materials Research Society logo formed from a Ni-based superalloy

made by direct metal laser melting and enabled by AI. This superalloy is used for the hot gas path components of land- and air-based turbomachines. This is an example of the use of probabilistic ML to accelerate the process parameter development in additive manufacturing of critical new high-temperature alloys. Courtesy of GE Research. See the technical theme that begins on p. 530.



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About the Materials Research Society

The Materials Research Society (MRS), a not-for-profit scientific association founded in 1973 and headquartered in Warrendale, Pennsylvania, USA, promotes interdisciplinary materials research. Today, MRS is a growing, vibrant, member-driven organization of over 16,000 materials researchers spanning over 80 countries, from academia, industry, and government, and a recognized leader in the advancement of interdisciplinary materials research.

The Society's interdisciplinary approach differs from that of single-discipline professional societies because it promotes information exchange across many scientific and technical fields touching materials development. MRS conducts three major international annual meetings and also sponsors numerous single-topic scientific meetings. The Society recognizes professional and technical excellence and fosters technical interaction through University Chapters. In the international arena, MRS implements bilateral projects with partner organizations to benefit the worldwide materials community. The Materials Research Society Foundation helps the Society advance its mission by supporting various projects and initiatives.

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