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## **Staving Off Economic Geology Workforce Extinction: University of Arizona's Lowell Program in Economic Geology**

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Evolving, multi-faceted approaches can address the multi-decadal atrophy of economic geology education in the US and beyond. Recognized since the 1980s, causes for decline include research specialization, curricular changes, funding shifts toward other fields (and low commodity prices), corporate consolidation, and increasing segregation of geoscience departments from other mining-related programs. Contrasting challenges require different approaches at all levels – undergraduate to professional.

At the University of Arizona, efforts to arrest this decline and rebuild began in the 1990s through conversations with industry partners and alumni, notably J. David Lowell. Endowments from the Lowell family enabled creation of the industry-focused Lowell Program in Economic Geology (2004) and later the campus-wide Lowell Institute for Mineral Resources (2009; collaboratively with Mining Engineering and others). Based on input from industry, LPEG began with a novel project-based professional masters program and a unique series of 10-day intensive professional development courses. These complemented traditional MS and PhD programs plus new (2020-25) graduate certificates, accelerated masters, and 2-day “inputs” overview courses (mostly online). Since 2005, two faculty (on average) advised >100 graduate students and >1,500 industry short course participants – all without significant university funding beyond faculty salaries. Success inspired creation (across campus) of affiliated programs in geometalurgy, geotechnics, and reclamation.

What was/is critical for success? (1) Partnerships/consortia with industry ± government focused on shared strategic needs including graduate/professional education plus relevant, fundamental geologic studies. (2) Engagement and support for capable faculty [when they can be found!] who will forsake some typical academic rewards to contribute to a longer-term vision. (3) Benign neglect by university management allowing programs to gestate, innovate and operate outside bureaucratic “strategic” constraints. Can we ensure that such programs (and future workforce) stay off the endangered list? – With long-term commitments and partnerships lasting through thick and thin, maybe. The jury's still out.