

Positions Available

POSTDOCTORAL POSITION

is available in the atom probe laboratory of the Surface Science Section at Institute of Materials Research, Tohoku University, Japan, in early 1993. The candidates must have a PhD in either materials science or metallurgical engineering. Strong background in physical metallurgy or phase transformations is desired. Experience in atom probe is not required, but experience in TEM is desirable. Applicants must have the ability to conduct both collaborative and individual researches. The current projects include atom probe studies on nanostructured magnetic materials, amorphous alloys, intermetallics and phase transformation of aluminum alloys. The salary is competitive. Applicant should send resume, publication list, copies of selected publications and names of three references to:

Prof. Toshio Sakurai
Institute for Materials Research
Tohoku University
Sendai 980
Japan
Fax: + 81-22-215-2020

**FACULTY POSITION IN MATERIALS SCIENCE & ENGINEERING
University of Utah**

Department of Materials Science & Engineering at the University of Utah is accepting applications for a tenure-track faculty position at the assistant professor level. The candidate must have a PhD in a materials related field with primary interest in the area of electron microscopy applied to materials. Successful candidate will be expected to teach courses at both the undergraduate and graduate levels, and to develop an independent research program. The position is expected to be filled before January 1992. Send resume and at least three letters of references by **November 30, 1992** to:

Prof. Richard H. Boyd, Chair
Department of Materials Science & Engineering
304 EMRO
University of Utah
Salt Lake City, Utah 84112

The University of Utah is an Affirmative Action/Equal Opportunity Employer and encourages nominations and applications from women and minorities.

NOMINATIONS SOUGHT FOR THE DEAN

**School of Mines and Metallurgy
University of Missouri-Rolla**

The School of Mines and Metallurgy at the University of Missouri-Rolla is a 122-year-old, internationally-renowned institution, conducting research and instruction in the fields of ceramic, geological, metallurgical, mining, nuclear, and petroleum engineering, as well as in geology and geophysics, and in the Graduate Center for Materials Research, the Rock Mechanics and Explosives Research Center, and the Generic Mineral Technology Center for Pyrometallurgy.

The current dean, Don L. Warner, has announced his retirement. The Dean of the School of Mines and Metallurgy reports to the Chancellor and is responsible for the administration of the School through its departments and centers. Academic training, professional experience and achievements, and demonstrated success in administration will be considered in the selection process.

Applications and nominations for the position should be submitted to:

C. Dale Elifrits, Chairman
Search Committee for the Dean of the School of Mines and Metallurgy
Room 206 Parker Hall
University of Missouri-Rolla
Rolla, MO 65401

It is requested that dossiers be submitted to be received before **October 5, 1992**, when the selection process will begin.

The University of Missouri-Rolla is an Equal Opportunity Institution.

**FACULTY POSITION IN INFORMATION STORAGE MATERIALS AND DEVICES
Stanford University**



The Departments of Materials Science and Engineering and Electrical Engineering invite applications for a tenure-track faculty position in the area of magnetic or optical information storage. A PhD and a strong interest in graduate and undergraduate teaching are required. The research activities of this individual should focus on the science and technology of information storage materials and devices and might embrace magnetic thin films, magneto-optic materials, optical storage materials, or other relevant materials and techniques. The successful candidate will be embedded in an environment with substantial activities in surface and interface science, magnetism, solid state physics, advanced optics, information science and nanostructure science and technology and have an interest in the fundamentals and applications of both materials and devices. The opening is at the assistant professor level. The appointment will be made either in the MS&E Department or the EE Department or both. Please send a complete resume, a publication list, a statement of research and teaching interests, and the names of three references to: Prof. Robert L. White, Department of Materials Science and Engineering, MS 2205, Stanford University, Stanford, CA 94305, by **December 1, 1992**.

Stanford University is an equal opportunity/affirmative action employer and encourages applications from women and minority candidates.

Ad closing for the November MRS Bulletin is October 1, 1992.

To place your ad, call Mary E. Kaufold at (412) 367-3036 today!

POSTERMINARIES

T-T Coupling

While leafing through a recent issue of *Technology Review*, I came across a line in an article by Langdon Winner¹ that read: "What seems most difficult to admit in an age of rapid innovation is how strongly involved we become with some of the objects

we use." His point was that we become emotionally attached to yesterday's devices.² I had also been reading text submitted for *MRS Bulletin's* new Education Exchange column and was pondering approaches that might strengthen the coupling between technology and teaching (*T-T* coupling). For the young people we are try-

ing to educate, extrapolation of Winner's view predicts an intimate attachment with devices of today, not yesterday. Although *T-T* coupling is beginning to occur in the schools, known approaches seem to employ incremental gradualism as the only way to keep all process participants within their own comfort zones. We know, how-

ever, that rapid human-initiated change, including enlightenment, is usually a reaction to crisis, not comfort. How might we focus great energy and attention on the issue, i.e., on the vertex where *Ts* collide? Why not base a shock-therapy-like object lesson on Winner's observation of our emotional attachment to technology's fruits—extrapolated to the appropriate date?

An Idea After Its Time

Imagine having permission to use only devices or implements based on inventions, or derived from discoveries, that occurred more than 10 or 25 or 50 years ago. Despite your attachment to cloth diapers and glass milk bottles, you would quickly feel impotent. Why? Because "science confers a power that we exercise every time we switch on a TV set or an automobile [emphasis added]."³ It stems as noted by Hobson³ from abstractions such as force and energy and from inventions such as radios and heat engines about all of which so few appreciate underlying concepts or details and so many take for granted.

Taking a page from the U.S. campaign to end cigarette smoking by demonstrating in a "Great American Smoke-Out" that the most addicted can survive at least one day of abstinence, why not pick some early 20th century date and foist a "Great American Tech-Out"⁴ on an unsuspecting public? Publish lists of things we may not use—no television, no jet aircraft, no compact discs, no PCs, no self-cleaning ovens, no cordless phones, no ball-point pens, and the list goes on. Of course, some humanitarian exemptions would be appropriate in such as the medical area, but the message will have been delivered.

Would not such heightened awareness force coupling of teachers and technologists in our schools?⁵ Drastic problems require drastic solutions—could anything be more drastic than being without direct distance dialing for a day? And think of the missing materials. Return with me now to days of nylon nylons, Bakelite™ phones, oil-base paints, vacuum tubes, cloth electrical tape, fountain pens, frying pans that need scrubbing, and to days when kilotons of TNT could not be packed into just one bomb.

Too simple? Perhaps. Because the next step would require channeling the resulting hysteria into a positive desire by students, old and young, to unravel the etymology* of each convenience turned quasi-necessity. Minds captured in this way must wonder if today's date were picked as the Tech-Out cutoff date by their

grandchildren forty years hence, whether developments in the interim will be missed nearly as much and be as revolutionary as ours. Think of the thousands of school-room essays to be culled from a single Tech-Out experience.

Technology as Perversion and Panacea: Renormalizing the Interaction

OK! We can't really expect people to do without a VCR for a whole day, but isn't it still a good awareness-raising "gedanken" experiment? My knee-jerk answer was "sure!" until the two-pronged societal downside of high tech yanked me back to reality. Believe it or not, some view the technology we have bestowed on modern civilization more as perversion than panacea. Beyond the obvious nuclear weapon is the test-tube baby and we wonder if we have exceeded our authority. Sherry Roberts' editorial comment in *USA Today*,⁶ "Someone has to stand up to science and say 'you can't give man [sic] everything he wants,'" exemplifies the worry. She goes on to ask how much better off will we be if we can't match progress with an increasing generosity of the human spirit?

It's easy for us to extrapolate the "too much of a good thing" viewpoint. Our more thoughtful students' essays may not simply anoint the boom box as the thing they missed most on the Great Gedanken Tech-Out Day. They may notice that retrenchment in some areas to a simpler environment might carry a net benefit on the human value scale. So I see inclusion of a heavy dose of the science-and-society ethos in curricula. Our *T-T* interaction will

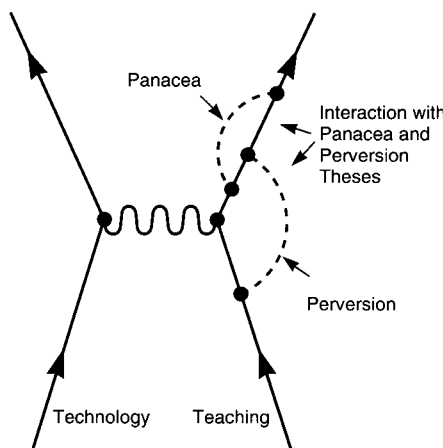
be renormalized by philosophy and some uncomfortable ethical divergences will be avoided or at least made integrable. (See figure.)

From the other extreme, the science-cure-all-ills advocates will surely pipe up. Let me paraphrase Patrick Michaels⁷ of the University of Virginia. He contends that it might be cynical of us to prematurely limit economic growth as a consequence of reducing CO₂ emissions. Instead, we can wait and depend on science—which has been miraculous to date—to come up with either something to fix or a way to adapt to the effects of global warming that we inflict on the world of the year 2150, when 2150 comes around.

This panacea perspective—the overreliance on future technology as fact versus potential—extrapolates simply to trusting that we can invent Band-Aids™ faster than we can inflict mortal wounds. Again, the fabric of our environment and the arrogance of technology impose a need for philosophical renormalization in the schools. (See figure.)

Both the pro- and anti-full-steam-ahead views give us pause to ask how we can teach preservation of our nontechnical essence while voraciously encouraging succeeding generations to learn and support, if not practice, advanced technology. Fully dressed, *T-T* coupling, energized by the Tech-Out exercise, may some day cause decisions rendered by the public and the policy makers on issues analogous to the Superconducting Supercollider and Space Station Freedom to be less stochastic than they are today.

E. N. KAUFMANN



T-T coupling showing both the exchange of the quantum of enlightenment that mediates the force in the Tech-Out collision and the renormalization of the vertex and the propagator for the scholastic branch due to interaction with its societal context.

References

1. Langdon Winner, "When Technologies Die, Do We Mourn?" *Technology Review*, Spring 1992 (MIT Alumni Association) p. 21.
2. Who among us has not longed for the appliances of days gone by? Think of the wringer washer, the slide rule, the fully manual camera, not because they were more convenient and not only for nostalgia, but because they didn't break or require batteries. If today's gross domestic product were not so dependent on engineered obsolescence, we would long less and things would last longer.
3. A. Hobson, *Physics and Society* 21 (2) (April 1992) p. 12.
4. A "Tech-Out" of any other nationality would work as well.
5. In this case the force would be mediated by the exchange of a quantum of enlightenment. (See figure.)
6. Sherry Roberts, *USA Today* (April 30, 1992) p. 13A.
7. Patrick Michaels, *Regulation* (Cato Institute, Summer 1991).

*We take license to broaden the etymon to include the thing as well as its name.