

Partnership

Designated Project Coordinator: James Acord, Sculptor. 1970 Saint St., Richland, WA 99352 - USA. Telephone (907) 746-0994. Places of work: Self-employed sculptor operating Hanford Nuclear Sculpture Works at above address and artist-in-residence, physics department, Imperial College of Science, Technology and Medicine, London, UK. (brief CV as supporting material) UK mail address through mid-March: c/o Dr. Wark, NAPL, Department of Physics, Keble Road, Oxford OX1 3RH.

Dr. D. L. Wark, Physicist. NAPL, Department of Physics, Keble Road, Oxford, OX1 3RH. Telephone [REDACTED] Places of work: The Rutherford Appleton Laboratory and University of Sussex (Brief CV as supporting material)

Project Title and Project Summary

Tc (N) Ru

In this century, transmutation of elements has become possible through nuclear physics. Sculpture is the logical and inevitable art to utilize this nuclear process. Technetium was the first element to be discovered via nuclear process and today exists in quantity in spent reactor fuel as isotope Tc99. Through neutron capture Acord and Wark will transmute it to Ruthenium, a non-radioactive member of the platinum family, and incorporate it into a sculpture reliquary depicting humankind's understanding of the nuclear age. Tc99, with a 213,000 year half-life, poses a clear health hazard far into the future. Transmuting it into non-radioactive material is a clear solution.

Project Development

The creation of sculpture using neutron capture to transmute radioactive waste to a non-radioactive precious metal will be partnered under two fundamental concepts: Firstly, in this century, physics has altered our understanding of everything and elevated material technology to a new paradigm. The ability to transmute and create elements through nuclear process has yet to fully evolve from its direct use in the creation of art. Secondly, sculpture illuminates and interprets material reality. At its best, sculpture creates symbols for which there is not yet language or understanding, moving things only faintly sensed into reality. It is anticipated that both scientist and artist will collaborate extensively on all aspects of this project. Dr. D. L. Wark has extensive knowledge of nuclear physics and James Acord, a life-long artist, has worked on this project for eight years.

Work Plan and Time Scale

Fabrication of non-nuclear portions of sculpture by James Acord with design iconography of maths and physics notations collaborated with Dr. D. L. Wark. Final checks on all maths and tailoring to specific reactor flux by Dr. Wark using preliminary calculations of James Acord. Neutron source selection and arrangements for use led by Dr. Wark, reactor use (time in core) and chemical separations by both Acord and Wark.

- Upon securing funding, James Acord travels to London and resumes artist-in-residency at Imperial College (office and shop space). Acord secures lodging in London for four months. Existing preliminary designs for sculpture, along with the physics and maths, are reviewed with David Wark. A materials and tooling list is drawn up. (three weeks - first interim report)
- As this project is not technically demanding and well within the capabilities of a large variety of facilities, a list of suitable and available neutron sources is drawn up and approached. At this time the facility will be selected, travel and transportation arranged and materials for the sculpture are ordered through Blackett Laboratory Shop. (four weeks - second interim report)
- Before and after the transmutation work at the reactor, James Acord will work on the creation of the body of the sculpture at Blackett Lab, Imperial College. Lead-time in scheduling the reactor is unknown, but two to three weeks of one or both partners at the selected reactor will see the

transmutation through. If hot chemistry is available at the reactor site, the separations can be done there, otherwise at Imperial College. Return from reactor with transmuted Ru. (three weeks - third interim report)

- Finish the sculpture, including the incorporation of the transmuted Ruthenium, at Blackett Lab. The estimated time from beginning to completion of the sculpture is four months.

Outcome

The production of exhibitable sculpture with supporting drawings, text and correspondence is fundamental. It can be expected this project will draw considerable attention from the media and tour to multiple exhibit venues. Additionally, both James Acord and Dave Wark are articulate, personable and enthusiastic about this partnership and will be available for conferences, interviews and symposia. A greater understanding of nuclear issues, science and technology, management of radioactive wastes, their long-term health effects and how art and science in partnership can contribute to public understanding of technical issues, is fundamental to this project.

	Budget
James Acord:	
Travel USA to UK, return	£ 800
within UK, 4 months	800
Lodging, UK, 4 months	5,000
Stipend (living allowance, 4 months)	4,000
Material (via Blackett lab)	8,500
Sub-contracted specialized processes (ie; electroplating, optics,)	3,200
Mounting and preparing supporting material for exhibit	2,800
Dr. D. L. Wark:	
Travel, within UK, and Lodging (visits to London)	500
Acord and Wark:	
Technetium 99 purchase	400
Travel to, within, and return, (foreign country) and reactor use.	6,000
Transport containers and incidentals for handling radioactive material	1,200
Post-irradiation chemical separations (if performed in UK)	1,800
Total project budget (estimated)	£ 35,000

It is anticipated that all necessary funding will come from the Sci Art consortium. James Acord will be the partner working full-time on the project, and anticipates having an office and shop space supplied at Imperial College through his continuing artist-in-residency. In return he will give infrequent lectures at I C and other schools, as Imperial College's resident artist, and secondary schools through I C's Pemlico program. Other than travel to the foreign reactor, Dave Wark should be able to continue his teaching and scientific research, consulting with the artist and contributing to the partnership frequently, but at his convenience. In the event of the unforeseen, or if the aforementioned budget proves inadequate, additional funds will be sought elsewhere, perhaps through pre-selling some of the anticipated art work.

signed, James Acord, sculptor - 6 January, 2000

Partnership's Rights

The members of the Partnership, James Acord and Dr. D.L. Wark, are unencumbered in this undertaking and retain all rights.

Managerial Expertise and Effective Partnership

The enclosed CVs of James Acord and Dr. D.L. Wark attest to the lengthy professional experience necessary to realize this project. Mutual professional respect, enthusiasm for art and science, a desire to accomplish a difficult task and a growing friendship create an effective partnership.

Research and Development to Date

In 1992 James Acord conceived the idea of using fast neutron capture to transmute Technetium 99 to Ruthenium 100, and use this reactor-produced metal in sculpture. He assembled a team of four scientists and engineers working at the Fast Flux Test Facility, a U S Department of Energy reactor located on the Hanford Nuclear Reservation, who assisted him in submitting a proposal to perform this art-based transmutation. At this time, Acord had resided in the Hanford community for four years, taken academic classes in nuclear science and engineering and been issued a radioactive materials license. FFTF was considering soliciting private sector users to supplement its mission and budget. The U S DOE agreed in principal but set a prohibitively high user's fee. This reactor was subsequently placed on standby. Massachusetts Institute of Technology's nuclear engineering department thought they could facilitate this artwork in their MIT II teaching reactor during Acord's lecturing visit in 1994. The U S Navy would not allow this for security reasons. Acord returned as artist-in-residence in Imperial College's physics department in fall of 1999 with the full expectation of reactor access, but an unfortunate world-wide series of nuclear accidents and scandals caused the director of the reactor to decline on grounds of potentially detrimental publicity. At no time since 1992 has any responsible scientist questioned the math or basic physics of this art project; indeed, those facts are well-known. Dr. D. L. Wark is a physicist with wide knowledge of nuclear physics, has conducted neutrino detection experiments in Britain, Canada, France and Russia and is certainly capable of adjusting calculations for any reactor's specific flux.

Identifying and Reaching the Audience

Broadly speaking, the audience for increased understanding of issues of the nuclear age through an art - science collaborative project is everyone, as we are all affected. More narrowly defined, the successful completion of this partnershiped project, and its attendant publicity, will reach the young artists and scientists of today; the leaders of tomorrow. Respectable documentary film teams in the USA, UK and Germany have approached Acord requesting permission to document this sci art partnership project. We expect that orders of magnitudes of people who never have the opportunity to see the exhibit of the finished sculpture will become aware of it. The completed sculpture, with supporting material, will be exhibited by The Arts Catalyst (possibly with the current exhibit "Atomic", now traveling) and in deference to Imperial College's continuing support of this project, we plan to exhibit there as well. Many venues are available for the exhibit of this sci art partnership project in UK, USA, Europe and beyond.

Designated Project Coordinator; James Acord, sculptor
6 January, 2000

JAMES L. ACORD

Born: 1944, Seattle, WA USA

**Studio/Residence: 1970 Saint
Richland, WA 99352, USA**

EDUCATION

Cornish School of Art, Seattle, WA
Fine Art; Sculpture, 1962

SCULPTURE TRAINING:

Over thirty-five years devoted to acquiring thorough familiarity with traditional materials and processes of sculpture through industrial employments and recent education and training in advanced technology.

- METAL: Non-ferrous through specialty steels. Job titles include: Fitter, Iron-worker, Shipwright, and Metal Finisher. Supervisory and quality control experience. Recent training in Titanium and Zirconium welding.
- STONE: Journeyman Sculptor; Granite Cutters International Association, Barre Branch (Vermont), since 1980. Extensive experience carving all traditional stone.
- WOOD: Woods, Mill, Re-saw, Cabinetry, Model- and Pattern-making.

ADVANCED TECHNOLOGY:

Academic studies in nuclear science (Washington State University - Tri-Cities Graduate Center, 1989 & 1991) and training (Hanford Nuclear Reservation, 1990 & 1992) Meeting US Department of Energy 5480.11 and 10 Code of Federal Regulations, part 20 (1991), Title 246 of WAC, and US Nuclear Regulatory Commission Regulations. Radioactive Materials License Number: WN-IO407-1.

RECENT PROFESSIONAL EXPERIENCE:

1999, Autumn. Artist-in Residence; The Arts Catalyst and Imperial College of Science, Technology and Medicine, London and Nottingham's NOW ninety9 Arts Festival.
1998, Autumn. Artist-in-Residence; The Arts Catalyst and Imperial College, London.

SELECTED LECTURES, PERFORMANCES, PRESENTATIONS AND CONFERENCES:

- In the course of residencies in UK (1998 - 1999) presentations at some dozens of colleges, universities, schools and arts organizations were given, in London and the Mid-lands.
- Ljubljana, Slovenia, August, 1999
- "Art and the Atomic State" Imperial College, London. November, 1998
- British Association for the Advancement of Science, Cardiff, Wales, August, 1998

- "Eye of the Storm" conference. Royal Institution, London, February, 1998
- "Transnacionala" a conference with IRWIN, NSK, and Center on Contemporary Art. Seattle, WA. July, 1996
- Massachusetts Institute of Technology, Cambridge, MA, 1994
- US Dept. of Energy Annual Waste Management Conference, Phoenix, AZ, 1993
- The Atom and Human Values; annual meeting of The American Nuclear Society, Boston, MA, 1992.
- FFTF Internationalization Symposium, Patterson, WA, 1991
- National Humanities Center, Research Triangle Park, NC, 1989

HONORS AND AWARDS:

- Fellow: New Genres; National Endowment for the Arts, 1994 - 1995
- Public Communication Award - American Nuclear Society. 1994
- Fellow: Art Matters, Inc. (New York, NY) 1994
- Fellow: Regional Artist's Project Grants Program. 1993. (Andy Warhol Foundation, NEA and The Rockefeller Foundation)

SELECTED EXHIBITS / INSTALLATIONS:

- "THE UNKNOWN DRAWINGS OF ACORD: 20 YEARS FROM ALASKAN COLLECTIONS"
Wasilla, AK. January, 2000
- "ATOMIC" Wollaton Park, Nottingham, UK
Autumn, 1999
Kluze, Slovenia, Summer, 1999
Imperial College, Autumn, 1998
- "DOCUMENTS: FIVE YEARS AT HANFORD"
Two Bells, Seattle, WA 1994
- "TRANSMUTATIONS: SCULPTURE FOR THE NUCLEAR AGE" Knoxville Museum of Art, Knoxville, TN, 1993.
- "HANFORD: WORK-IN-PROGRESS INSTALLATION". Richland, WA, 1993
- "CHRONICLES: NUCLEAR MATERIALS INTO ART" Hoffman Exhibit Gallery, Portland, OR, 1993
- "SAVE THE REACTOR!" Gallery 154, Seattle, WA. April - June, 1992
- "TRANSMUTATIONS/ART IN A NUCLEAR AGE" Spokane Art School Gallery, Spokane, WA, Autumn, 1991
- "GLOVE BOX PROJECT"
Center on Contemporary Art, Seattle, WA, July - August 1990
- "MOVING TO RICHLAND"
911 Contemporary Arts Center, Seattle, WA, June, 1989

Temporary address through March, 2000:

James L. Acord
P.O. Box 874321
Wasilla, Alaska 99687-4321
(907) 746-0994
mphilip@matnet.com

Curriculum Vitae

Dr. David L. Wark

Address: NAPL Dept. of Physics
Oxford University OX13RH
Telephone: [REDACTED]
FAX: [REDACTED]
Email: [REDACTED]

Education:

Ph.D. (Physics) 1987, Caltech, Pasadena, California, 91125
Dissertation Advisor: Professor Felix Boehm
Dissertation Topic: The Beta Spectrum from 252 Cf
M.S. (Physics) 1982, California Institute of Technology
B.S. (Physics) 1980, Indiana University, Bloomington, Indiana

Relevant Employment:

Oct. 1999 - present: Reader in Experimental Physics, Sussex University
Oct. 1999 - present: Staff member, Rutherford-Appleton Laboratory
Sept. 1996 - Sept. 1999: PPARC Lecturer Fellow stationed at Oxford University.
Sept. 1992 - Sept. 1999: Lecturer in Physics, Oxford University.
Fellow of Balliol College, Oxford.
Jan. 1990 - Sept. 1992: Research Officer, Oxford University.
Jan. 1991 - Sept. 1992: Four Hour Lecturer, Balliol College, Oxford.
Jan. 1987 - Jan. 1990: Postdoctoral Fellow, LANL, Los Alamos, NM, 87545.
Fall 1981 - Jan. 1987: Research Assistant, Teaching Assistant, Caltech.
Summer 1981: Research Assistant, Indiana University Cyclotron Facility.
1980 - 1981: Teaching Assistant, Indiana University.
Summer 1980: Research Assistant, Univ. of Georgia, Athens, GA.
1979 - 1980: Teaching Assistant, Indiana University.
Summer 1979: NSF Undergraduate Research Participant, UGA, Athens, GA.

Technical Experience:

I have a wide range of experience in the design, construction, and operation of physics experiments

including high-vacuum systems, cryogenics, detectors, low-background environments, and electronics (and I have an Ontario Bureau of Mines certification as a miner!). I have also been extensively involved in software development for particle physics, including being group leader for the offline analysis and Monte Carlo software for SNO. As UK co-spokesman for SNO, I have also gained considerable experience in securing and managing a large grant (total UK expenditure on SNO is now well over £1,000,000).

Teaching Experience:

I have been lecturing for over 20 years, giving lectures on a wide range of physics courses. My lecture courses at Oxford have been consistently highly rated. I also taught tutorials for Balliol College for 5 years, and have done laboratory demonstrating at Oxford and Caltech. I also have considerable experience in communicating science to the public, having given public lectures in many places, including the Royal Institution and the British Association of the Advancement of Science. I was recently one of six scientists selected by Channel 4 to present the greatest scientists of the millennium, in their series "Millennium Minds."

Honors:

Awarded the first PPARC Lecturer Fellowship
National Merit Scholar
1980 Outstanding Physics Undergraduate, Indiana

University Experiments:

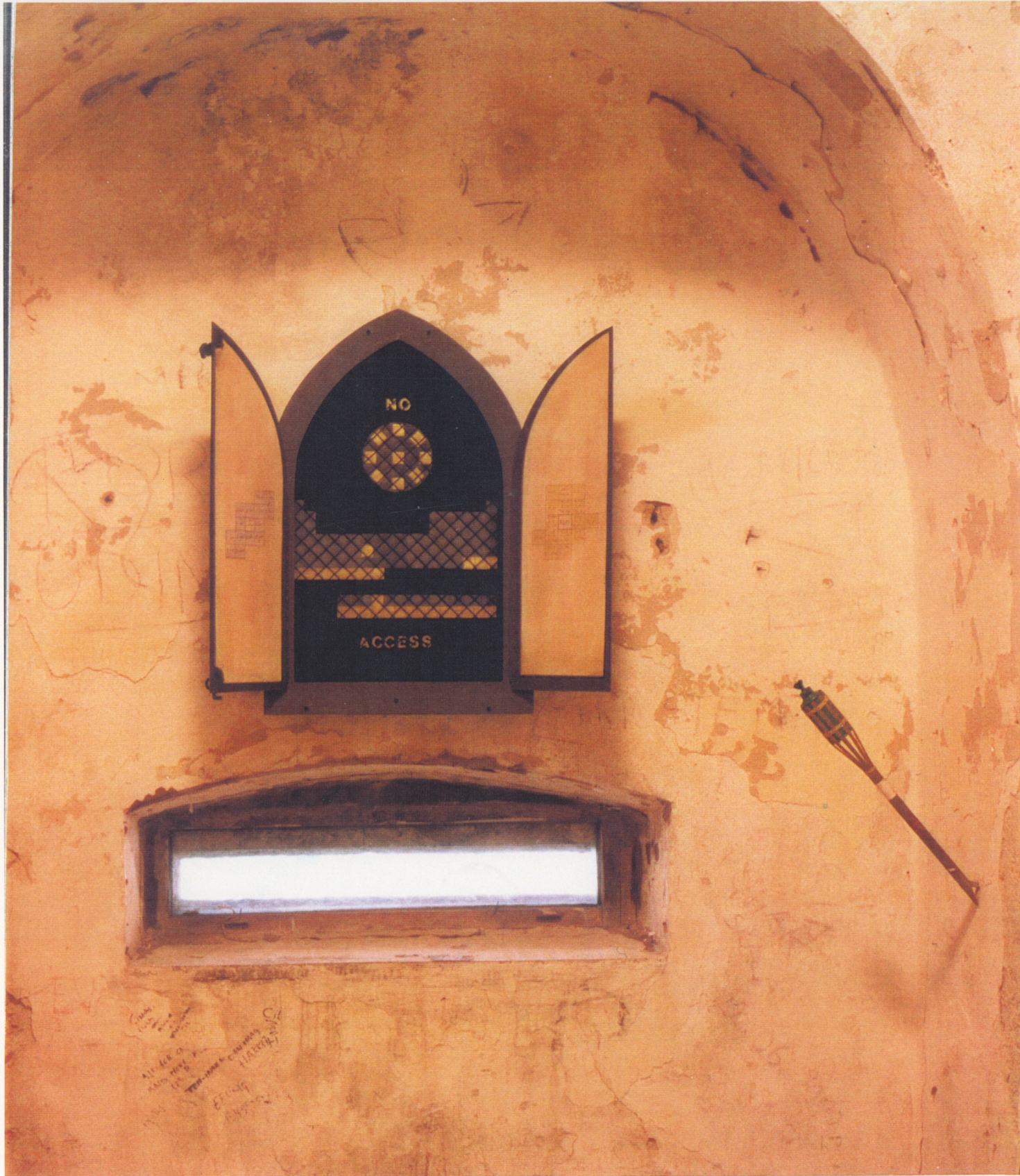
SNO, ANTARES, SAGE, Los Alamos tritium beta decay,) other beta-spectroscopy experiments at SLAC, Caltech, Argonne, and the NPL.

Computing:

FORTRAN, C, C++, OO Analysis and design, PERL, Basic, Mainsail; VAX-VMS, UNIX, CP/M, DOS, Linux, and Windows NT.

Personal:

Born in Salem, Ohio, June 8, 1958.
Married, one child.



"NO ACCESS" - 1998 - James Acord
Installation View
ATOMIC Exhibit - trdnjavi Artilerija, Bovic, Slovenia - 1999
Photo by Carey Young