Department of Employment, Education and Training
Australian Research Council

Application for Initial Support in 1991

When completing this form you must refer to the 'Advice and Instructions to Applicants' document.
Do not attach any papers to the front of this form. Applications must be typed.
Applications are to be lodged with the:

Director, Research Grants Section
Research Policy and Grants Branch
Department of Employment, Education and Training
GPO Box 9880
CANBERRA ACT 2601

The closing date for applications is 1 March 1990.

Office use only
File number

I

1 a. Institution to administer grant

University of Wollongong

b. Academic Organisation Unit (institution to complete)

2. Project title

Provide a project title that is clear, brief, precise and informative to workers outside your field.
(Up to four lines; do not hyphenate words at the end of the line.)

Maximum of 38 characters per line

The social and policy implications

of road transport informatics

3 a.Total funds requested in this application. (Whole dollars only)

1991	1992	1993
9830	0	

See Instructions for codes
b. Category 7,0,7
Priority area

4. Chief Investigator(s) - see instructions

	1.	2.	3.
a. Title, initials and surname (eg. Prof, A/Prof, Dr)	Dr P. Scott	Dr B. Martin	
b. Full address	Faculty of Informatics U of Wollongong	Department of Science and Technology Studies U of Wollongong	
	Telephone(042)270606 Fax: (042)270477	Telephone:(042)270763 Fax: (042)270477	Telephone: Fax:
c. Appointment held	Lecturer	Lecturer	
d. Name of Dept/School/Other (please indicate which)	Faculty of Informatics	Department of Science and Technology Studies	
e. Year of birth	1945	1947	
f. Highest academic qualification (indicate conferring institution and date)	PhD, U of Wollongong, 1987	PhD, Sydney, 1976	
g. Sex (please tick box)	Female [x] Male [ ]	Female [ ] Male [x]	Female [ ] Male [ ]
h. Average working days per month to be devoted to the project	5	5	

5. Support

Please tick if applying for support for this project in 1991 from NH & MRC [ ]   NERDDC [ ]   Other [ ]
If you have ticked one of these boxes, in Section 17 state the project title and the amount requested.

6. Work experiments

Does the work proposed involve human experimentation? Yes [ ] No [x]

Does the work proposed involve animal experimentation? Yes [ ] No [x]

Does the work proposed involve experiments in which there is preparation or use of recombinant nucleic acids constructed in vitro from sources which do not ordinarily recombine genetic information? Yes [ ] No [x]

7. Interviews

Will you be available for interview if required? (See instructions for dates) Yes [✓] No [ ] Uncertain [ ]
Note: An interview may be used in the assessment of a proposal. It does not indicate the progress or likelihood of success of the proposal.

8. Chief Investigator Information

For each Chief Investigator detail the following:

a. Indicate any anticipated period of absence from institution during the course of the project including OSP.

1.	2.	3.
	Two months in the US, first half of 1991 (partly to carry out research on this project)	

b. What other major research programs are being undertaken or supervised by the Chief Investigator(s)?

1.	2.	3.
Social analysis of scientific controversies	Social defence and technology policy	
Average days per month spent on these programs 5	Average days per month spent on these programs 5	Average days per month spent on these programs

Other Participants

9. Provide details of the Associate Investigators

List:
- name
- organisation
- highest qualification
- date conferred
- conferring institution
- involvement in the project (average days/month).

Certification required, see Section 20

10. What technical and other staff (other than those requested) will be available to assist with this project? Indicate the involvement in the project (average days/month).

11. Was this project funded as a small grant last year? If yes, please attach previous assessments, if any. Yes ☐ No ☒

12. Will there be any research or honours students working on the project? Yes ☐ No ☒

If yes, state the number in each case.

13. Commencement/Completion date of project

Has the project started? Yes ☒ No ☐ If no, when will it start? / /

How long will you need ARC support? 1 years How long will this project take? 1.5 years

14. Budget information

Refer to the document 'Advice and Instructions to Applicants' for the completion of the budget information below.

Office use only - File number
Cat. code:

Detailed budget items	Priority	Amount requested 1991	1992	1993	Office use only
Travel					
(1) Europe					
Sydney-London-Sydney low season excursion fare + 10%	A	2600			
London-Berlin-London, train	A	300			
Accommodation, 21 days @ $100/day	A	2100			
Food allowance, 21 days @ $40/day	A	840			
Travel in London and Berlin, $10/day	A	210			
(2) Australia					
Melbourne: return air fare + 10%	A	426			
accommodation, 4 days @ $100/day	A	400			
Canberra: bus fare and taxi	A	100			
accommodation, 1 day @ $100/day	A	100			
Sydney: 3 rail fares and taxi	A	80			
Personnel					
Research assistance, 110 hours @ $18.86/hour	B	2074			
Other					
Postage	C	50			
Telephone	C	150			
Photocopying	C	50			
Computer search, Dialog 3 hours @ $90/hour + extras	C	350			
Total		9830			

Financial Summary

Support requested	Personnel $	Equipment $	Maintenance $	Travel $	Vessel $	Other $	Total $
1991	2074			7156		600	9830
1992							
1993							

Office use only

Surname of 1st Chief Investigator	Administering institution
Scott	U of Wollongong

4.

15. Key symbols

Give up to six key symbols to describe the subject area of proposal.
(maximum 6 characters per key symbol)

BGAE					

16. Summary of project

In the space provided below, write a summary in no more than seven lines, of why this project is of significance. This summary should be written in a style understandable to the intelligent reader. Use underlining, capital letters and any other emphasis only where required by convention eg. underline species names.

Road Transport Informatics (RTI) refers to the use of information technologies in road transport, such as automatic vehicle identification, onboard computers and smart card systems, and route guidance systems. Governments around the world are committing substantial resources to the development of these technologies. There is a need for a comprehensive analysis of the social costs and benefits, involving issues such as privacy and surveillance, as well as the political and economic issues raised by these technologies. This analysis will provide policy guidelines and theoretical insights into the shaping of technological change.

Total support

17. List separately the support received, requested or to be requested **for this project** from your own organisation and all other sources.

Name of organisation	1988 $	1989 $	1990 $	Requested 1991
University of Wollongong, Information Technology Research Programme Grant			4550	

18. List separately the support received or requested for **all other projects** from whatever the funding source. Continue on a separate sheet if necessary.

Name of organisation and title of project	1988 $	1989 $	1990 $	Requested 1991
ARGS, Technological vulnerability (BM)	10,000			
U of Wollongong, Electromagnetic pulse (BM)	1300			
U of Wollongong, Australian Animal Health Laboratory (PS)	6000			
U of Wollongong, Life Sciences research programme grant		7000		
U of Wollongong, Research programme grant, scientific controversies			5800	
ARC, Scientific controversies				34,823

19. Average number of working days per month to be devoted to all projects to be undertaken in 1991 (include this project).

1st Chief Investigator [10] days   2nd Chief Investigator [10] days   3rd Chief investigator [ ] days

Surname of 1st Chief Investigator	Administering institution
Scott	U of Wollongong

20. Certification - to be signed by all applicants

I/We certify that all the details on this form are correct.

I/We understand and agree that:

- research which involves human or animal experimentation must be carried out in accordance with the guidelines laid down in the NH & MRC code of practice;

- research which involves the use of recombinant nucleic acids constructed *in vitro* from sources which do not ordinarily recombine genetic information must be carried out in accordance with the guidelines laid down by the Recombinant DNA Monitoring Committee;

- research which involves the use of ionising radiation must have the risks involved assessed by a recognised Ethics, Safety or Bio-safety Committee, personnel must be trained and hold a current licence, and;

- a certificate of compliance with the appropriate guidelines must be received by the Committee from a recognised Ethics, Safety or Bio-safety Committee before payment of any proposed grant can be made.

I/We declare that all persons listed as Associate Investigators have agreed to take part in the proposed research.

Signature of Chief Investigators

1. _____   ____/____/____
   (Signature)   (Date)

2. *Brian Martin* _____   26/2/90
   (Signature)   (Date)

3. _____   ____/____/____
   (Signature)   (Date)

Certification by Head of Department

- I certify that the project can be accommodated within the general facilities in my Department, that sufficient working and office space is available for any proposed additional staff. I am prepared to have the project carried out in my Department under the circumstances set out by the applicant;

- I have noted the amount of time which the investigators will be devoting to the project and certify that it is appropriate to existing workloads.

Note: A confidential statement may be forwarded to the Committee if thought advisable. Refer to the 'Advice and Instructions to Applicants'.

_____   ____/____/____
(Signature)   (Date)

Certification by Head (or Nominee) of Organisation/Institution

- I certify that the project is acceptable to the organisation under the terms and conditions set out in the 'Conditions of Award' and 'Advice and Instructions to Applicants' and that salaries quoted for personnel are in accordance with practice at this organisation;

- I certify that this project is not a specific component of this organisation's budget;

_____   _____   ____/____/____
(Signature)   (Designation)   (Date)

Note: All certificates must be signed.

21. Aims, research plan, justification of budget, and publications

- To answer this question fully refer to the document 'Advice and Instructions to Applicants' so that you can cover the points specifically made in it, especially in relation to policy and priority information and in detailed justification of the budget proposal.

- Your explanation should be comprehensive but brief.

- **The council has ruled that no more than 12 pages including this form (but excluding relevant publications), will be considered in the assessment process. For proposals over $100,000 or with more than 2 Chief Investigators, the page limit is 15. Pages in excess will be discarded.**

- Use the following headings to detail your answer:
  - Aims and significance
  - Research plan, methods and techniques
  - Progress Report (see Appendix C of the 'Advice and Instructions to Applicants')
  - Justification of Budget
  - Timetable
  - Publications - you should list all your refereed publications for the last 5 years. Use asterisks to identify publications relevant to this project.

- Where the cooperation or assistance of another body is needed for the project to be successful, the council must be provided with appropriate details.

Aims and significance

Road transport informatics (RTI) is a term used to refer to the use of information technologies, such as computers and telecommunications, in road transport. For example, studies have been undertaken to see if computers in cars, communicating with central computing facilities, can be used to guide the driver along the most appropriate route.

The aims of this project are two-fold: to provide a social assessment of the various RTI technologies and to test contrasting theories of technological change on the same case study. RTI is a 'technology-in-the-making', and this is centrally important in both aims. Potential RTI technologies being considered include many versions of different types of systems (autonomous navigation aids, area broadcasting systems, local roadside transmitter systems, mobile radio systems and local roadside transceiver systems);[1] only some are being tested and only a few will ever be implemented. Unlike 'mature technologies' such as road vehicles themselves, the range of technological choices for RTI is quite extensive.

The social implications of RTI

A common pattern in the introduction of technologies is that most of the developmental work takes place without much social discussion. Then, after vast quantities of money and effort have been expended, the public is exposed to the technology and sometimes resistance develops, as in the case of nuclear power.[2] RTI seems to be following this familiar path.

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[1] OECD Scientific Experts Group, *Route Guidance and In-car Communication Systems* (Paris: OECD, 1988).

[2] Jim Falk, *Global Fission* (Melbourne: Oxford University Press, 1982).

Our aim is to assess the more important likely social impacts of RTI *before* major commitments for implementation are made. Our approach is to maintain methodological neutrality in relation to RTI. Our intention is to introduce social assessment at an early stage so that better decisions can be made both by RTI developers and by potential purchasers of RTI.

Our examination of the social implications of RTI which are normally omitted from technical studies will provide guidelines for developing policy on the future direction of research and implementation in this field. The policies of different countries will be compared and an assessment of developments in Australia will be made in an international context.

We have already carried out research on automatic vehicle identification (one aspect of RTI). In this research, we found that a wide range of technologies are being developed and tried out in various ways around the world (the United States, Norway, Hong Kong, Britain, West Germany, etc.).[1] But there appear to be no other social scientists critically investigating the implications of this technology in areas such as control of workers, surveillance of the population, and payment for road use.[2]

Theories of technological change

In recent years there has been considerable attention to a new approach to the study of technology, commonly called the 'new sociology of technology'.[3] In this approach, the researcher investigates what engineers and others involved with the technology do in day-to-day activities. This is a 'follow-the-actor' approach. The aim is to reveal the decision-making process as it occurs in informal 'negotiations' and networking between individuals, rather than relying on just the formal published descriptions.

RTI provides a useful case study for comparing theories of technology, precisely because RTI is new, developing and still largely unimplemented. Therefore, it is possible for us to use the 'follow-the-actor' method at the crucial stages while decisions about technologies and their relation to society are being made. We have already used this approach in our study of automatic vehicle identification, and made some revealing comparisons between structural and actor-network approaches to technology.[4] This sort of study is more difficult with established technologies.

Principal hypotheses

Essentially, our study of automatic vehicle identification served as a pilot for the wider study of RTI. On the basis of this, we propose to test the following hypotheses.

Hypothesis 1. The potential negative social impacts of RTI have played almost no overt role in the development and implementation of the technology.

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[1] For example, P. Davies and F. K. Sommerville, 'Development of heavy-vehicle electronic license plate concept', *Transportation Research Record* 1060 (1986), pp. 121-127.

[2] Pam Scott, 'Whatever happened to electronic road pricing?', submitted to *Traffic Engineering and Control*.

[3] For example, W. E. Bijker, T. P. Hughes and T. J. Pinch (eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, Mass.: MIT Press, 1987).

[4] Pam Scott and Brian Martin, 'Automatic vehicle identification: a test of theories of technology', submitted to *Science, Technology & Human Values*.

Test   Look through the technical literature on RTI, focussing on the rationale for technologies and assessment of costs and benefits.

Hypothesis 2. Local social factors have in practice played a crucial role in decisions about implementation of RTI.

Test   Use interviews with key individuals associated with major projects on RTI to determine the perceived reasons for implementation or lack of implementation.

Hypothesis 3. Neither actor-oriented nor structure-oriented theories of technology allow a full explanation of the dynamics of introduction or lack of introduction of RTI.

Test   Apply specific, contrasting theories to case studies of implementation and lack of implementation, and assess whether any theory can explain all key points explained by the competing theories.

Research Plan

The project can be divided into three overlapping phases, which correspond to the work required to test the three hypotheses above.

Phase 1.   Review current and previous work on RTI and identify and review the technologies which could potentially be used.   We have already done a preliminary literature search on RTI and a more comprehensive search on automatic vehicle identification technology.   Computer searches, surveys of journals and correspondence will be the tools used for collecting material for this component of the project.   In order to evaluate the material gathered, we will draw up a content analysis protocol.   We will use a research assistant to carry out the actual content analysis, checking the reliability of the assessments made with our own readings.   This review of RTI literature will allow testing of hypothesis 1.   Period: January-June 1991.

During this same time we will establish further contact with groups, organisations and government departments with interests and responsibilites in RTI.   Dr Pam Scott has already visited Hong Kong to research the Electronic Road Pricing Pilot Study undertaken there in 1985.   Contact was made with the Hong Kong Department of Transport, the Hong Kong Automobile Association, and MVA (Consultants) who had worked on the project.   We have established written contact with a number of overseas experts from Britain, U.S. and Europe.   In Australia we have had preliminary discussions with the Australian Road Research Board, the Commonwealth Department of Transport and Communications, the Victorian Road Traffic Authority and the National Roads and Motorists' Association.

Phase 2.   Undertake interviews with key individuals involved with three large trials of RTI currently being undertaken.   These are the AUTOGUIDE study in London due to be completed at the end of 1990, the DRIVE project, a £60m European Community programme, and the HELP (Heavy Vehicle Electronic Licence Plate) and FASTOLL schemes in the U.S.

It is essential to visit these centres for four reasons:

a) developments are often so rapid that by the time reports are published, they can be outdated;

b) often reports are not published at all, especially when private consultancy firms are involved;

c) those accounts that are published focus on the technical aspects and tend to ignore or overlook social considerations. This was very apparent with our Hong Kong research. Talking to the people involved revealed important insights which could not have been gleaned from published papers;

d) the methodology we wish to use requires the researcher to follow the actors, rather than rely on external documents and accounts, in order to understand the dynamics of emerging technologies.

Interviews with key individuals are essential for testing hypothesis 2. This portion of the project will run from April to December 1991.

Phase 3. Assessment of the social implications of RTI and comparison of theories of technology. This theory-and-writing part of the project will draw on our ongoing study of theories of technology which is proceeding in 1990. We intend to write about the social implications of RTI in general interest journals and about the implications for theories of technology in appropriate professsional journals. The comparison of theories will allow testing hypothesis 3. This portion of the project will run through the first half of 1992.

Progress report

Brian Martin received an ARGS grant for 1987-1988 for the topic 'The vulnerability of Australian technological systems to military threats'. The $20,000 received paid for part-time research assistance for about 9 months. The original aim was to study the vulnerabilities of computers, steel manufacturing and electricity production to military threats, and examine ways to make these technological systems more resilient. Due to receiving only 1/3 of the funding requested, steel manufacturing was made the focus of study. The project, as thus modified, has been completed, largely with unmodified aims.

The project involved developing a novel conceptual framework for analysing technological vulnerability, extensive interviews with key figures at BHP at Port Kembla, and evaluation of the findings in terms of ways of increasing resilience to threats. The main finding was that the steel industry appears to be surprisingly resilient to military threats, considering that no specific preparations have been made, mainly due to preparation for other contingencies such as electricity supply interruption.

Steel production today depends heavily on computers. The insights into vulnerabilities to disruption of computer facilities, plus literature collected as part of this project, are relevant to the RTI project. The project resulted in two publications, of which the more comprehensive and lengthy treatment is due to appear.[1]

Justification of budget

A computer search and systematic assessment of the technical literature is necessary both to test hypothesis 1 and as essential background to the rest of the project. The travel within Australia and to Europe is necessary to carry out the interviews essential for testing hypothesis 2. Below we give a detailed breakdown of anticipated expenses.

Travel

The key part of the project is interviews with key individuals involved with RTI in several countries.

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[1] Colin Kearton and Brian Martin, 'Technological vulnerability: a neglected area in policy-making', *Prometheus*, Vol. 7, No. 1, June 1989, pp. 49-60; Colin Kearton and Brian Martin, 'The vulnerability of steel production to military threats', *Materials and Society*, in press.

United States (no funding required from this application)

The HELP project, a major test of automatic vehicle identification, is due to be complete at the end of 1990. The headquarters for the project is in Arizona, with the involvement of institutions from various states including California and Texas. Interviews with individuals involved with the HELP project will be carried out in the first half of 1991 as part of study leave research by Dr Brian Martin. Therefore, there is no claim for assistance here.

Europe

In our previous work we have found that face-to-face interviewing is essential for obtaining information and written material that is unavailable otherwise. The interviews provide contacts to obtain further interviews, in a way that cannot be entirely forecast. Our estimates here build on previous interviewing experience on automatic vehicle identification in Australia and Hong Kong.

The key programmes to be studied are in England and Germany. The AUTOGUIDE driver information and guidance system is being trialled in London, coordinated by the Department of Transport. It is being sponsored by motoring organisations, equipment suppliers, transportation and engineering consultants, London buses and British motor manufacturers; it will be necessary to contact representatives from all these groups. In particular, we will be contacting the Oxford University Transport Studies Unit (which has worked on AUTOGUIDE), the Transport and Road Research Laboratory in London, the Automobile Association and the Royal Automobile Club.

The LISB system (guidance and information system, using a 2-way infra-red communication link) is being tested in West Berlin, and expected to be complete at the end of 1989. Two key contacts are the Federal Highway Research Institute in Cologne and Dr F. Bolte, Bundesanstalt fur Strassenwesen.

We anticipate a packed schedule for Dr Scott to cover the following organisations within 3 weeks:

Department of Transport, London: 3 days
Transport and Road Research Laboratory, London: 2 days
Automobile Association and Royal Automobile Club, London: 1 day
transportation and engineering consultant firms, England: 2 days
London buses and taxi companies: 1 day
equipment suppliers, England: 2 days
Oxford University Transport Studies Unit: 2 days
Federal Highway Institute, Cologne: 2 days
consultant firms, equipment suppliers, and other organisations, Germany: 3 days
The costs for a single three-week trip to carry out these interviews is as follows:

Sydney-London-Sydney, low season excursion fare (1990 + 10%)	$2600
London-Berlin-London by train	300
Accommodation, 21 days at $100/day	2100
Food allowance, 21 days at $40/day	840

Australia

The key organisations and groups are found in Melbourne, Canberra and Sydney. Melbourne has the highest density of relevant organisations, so a longer stay is planned there.

• One trip to Melbourne, to interview individuals at the Victorian Road Traffic Authority, the Australian Road Research Board, the National Transport Federation, Telecom, CSIRO (Ross Trayford and Mike Wooldridge) and La Trobe University.

return air fare, $388 + 10%	$426
accommodation, 4 days at $100/day	$400

• One trip to Canberra, to interview individuals at the Department of Transportation and Communications

bus and taxi fares	$100
accommodation, 1 day at $100/day	$100

• Three trips to Sydney, to interview individuals at the NRMA, NSW Transport Department, NSW Roads and Traffic Authority, and Transport Workers Union

rail and taxi fares	$80

Other

The first part of the project is a survey of the technical and other literature on RTI and an evaluation of its contents. From past experience, we expect the computer search using Dialog to tap several data bases at an average cost is $90 per hour. With a total of 3 hours and extra log-on and per-page costs, the total is $350.

Research assistance is required to carry out a systematic content analysis of the RTI literature, following the framework that we will establish. We anticipate a survey of 20 books (3 hours each) and 50 articles (1 hour each), giving a total of 110 hours of research assistance required.

Our request for photocopying, postage and telephone costs is modest. In our experience, our interviewees provide generous access to photocopying facilities and provide many documents free. Nevertheless, we expect costs in sending the photocopied material obtained in Europe back to Australia.

Timetable

January-June 1991: carry out computer searches, surveys of journals and content analysis of RTI literature; make arrangements for visits to US and Europe.

April-December 1991: Dr Martin interviews people involved with the HELP project while on study leave trip to US; Dr Scott interviews people involved with the AUTOGUIDE and DRIVE projects in Europe.

September 1991-June 1992: theoretical assessment of findings, writing up research.

Publications, 1986-   (publications indicated • are especially relevant to this application)

Pam Scott, 'Dealing with dissent: on the treatment of opposition to the Australian Animal Health Laboratory and the importation of live FMD virus', *Search*, Vol. 19, No. 1, Jan/Feb 1988, pp. 6-9.

Pam Scott, 'Row over animal health laboratory to drag on', *NSW Farmer*, Vol. 2, No. 3, April 1988, p. 21.

Pam Scott, 'The social shaping of a laboratory: the establishment of the Australian Animal Health Laboratory', *Prometheus*, Vol. 6, No. 2, December 1988, pp. 249-262.

Pam Scott, 'AAHL: a regional role?' *AVA News*, No. 10, November 1988, pp. 7-8.

Pam Scott, 'Culling technological white elephants: lessons from the Australian Animal Health Laboratory', *Science and Public Policy*, February 1989, pp. 47-51.

Gabriele Bammer, Ken Green and Brian Martin, 'Who gets kicks out of science policy?', *Search*, Vol. 17, Nos. 1-2, Jan-Feb 1986, pp. 41-46.

Brian Martin, 'Science policy: dissent and its difficulties', *Philosophy and Social Action*, Vol. 12, No. 1, January-March 1986, pp. 5-23.

Brian Martin, 'Bias in awarding research grants', *British Medical Journal*, Vol. 293, 30 August 1986, pp. 550-552.

Brian Martin, 'Agent Orange: the new controversy', *Australian Society*, Vol. 5, No. 11, November 1986, pp. 25-26.

Brian Martin, 'Nuclear suppression', *Science and Public Policy*, Vol. 13, No. 6, December 1986, pp. 312-320.

· Brian Martin, C. M. Ann Baker, Clyde Manwell and Cedric Pugh (eds.), *Intellectual Suppression: Australian Case Histories, Analysis and Responses* (Sydney: Angus & Robertson, 1986).

Brian Martin, 'Suppression in science', in Barry Butcher et al., *Science in Culture* (Victoria: Deakin University, 1986).

Brian Martin, 'Nuclear disarmament is not enough', *Peace Studies*, No. 3, June/July 1986, pp. 36-39.

Jill Bowling, Brian Martin, Val Plumwood and Ian Watson, 'Strategy against nuclear power', *Social Alternatives*, Vol. 5, No. 2, April 1986, pp. 9-16.

Brian Martin and D. T. Wickramasinghe, 'A test of the dipole model for the rotating magnetic white dwarf Feige 7', *Astrophysical Journal*, Vol. 301, 1 February 1986, pp. 177-184.

D. T. Wickramasinghe and Brian Martin, 'Magnetic blanketing in white dwarfs', *Monthly Notices of the Royal Astronomical Society*, Vol. 223, 1986, pp. 323-340.

Jacki Quilty, Lynne Dickins, Phil Anderson and Brian Martin, *Capital Defence: Social Defence for Canberra* (Canberra: Canberra Peacemakers, 1986), 68 pages. Also published in Italian as *Un Modello di Difesa Populare Nonviolenta* (Molfetta: Edizioni la Meridiana, 1987).

Brian Martin, 'Merit and power', *Australian Journal of Social Issues*, Vol. 22, No. 2, May 1987, pp. 436-451.

Brian Martin, 'Academic scapegoats', *Zedek*, Vol. 7, No. 3, August 1987, pp. 476-481.

Brian Martin, 'Social defence: elite reform or grassroots initiative?', *Social Alternatives*, Vol. 6, No. 2, April 1987, pp. 19-23. Reprinted in *Civilian-based Defense: News & Opinion*, Vol. 4, No. 1, June 1987, pp. 1-5. Reprinted in Dutch in *Geweldloos Aktief*, Vol. 23, No. 2, June 1988, insert pp. 1-7.

Brian Martin, 'The Nazis and nonviolence', *Social Alternatives*, Vol. 6, No. 3, August 1987, pp. 47-49.

Brian Martin and Evelleen Richards, 'Introducing women in science', *Philosophy and Social Action*, Vol. 14, No. 2, April-June 1988, pp. 3-6.

Brian Martin, 'The issue of intellectual suppression', *Philosophy and Social Action*, Vol. 14, No. 1, January-March 1988, pp. 3-13.

Brian Martin, 'Coherency of viewpoints among fluoridation partisans', *Metascience*, Vol. 6, No. 1, 1988, pp. 2-19.

Brian Martin, 'Analyzing the fluoridation controversy: resources and structures', *Social Studies of Science*, Vol. 18, May 1988, pp. 331-363.

Brian Martin, 'Education and the environmental movement', in Tom Lovett (ed.), *Radical Approaches to Adult Education: A Reader* (London: Routledge, 1988), pp. 202-223.

Brian Martin, 'Queensland versus Greenpeace: the Vega affair', *Gijutsu to Ningen (Technology and Humanity)*, June 1988, pp. 71-79 (in Japanese).

Brian Martin, 'The limitations of bilateral peace treaties', *Social Alternatives*, Vol. 7, No. 2, June 1988, pp. 37-41.

Brian Martin, 'Mathematics and social interests', *Search*, Vol. 19, No. 4, July/August 1988, pp. 209-214.

Brian Martin, 'Lessons in nonviolence from the Fiji coups', *Gandhi Marg*, Vol. 10, No. 6, September 1988, pp. 326-339.

Brian Martin, 'Nuclear winter: science and politics', *Science and Public Policy*, October 1988, Vol. 15, No. 5, October 1988, pp. 321-334.

Gabriele Bammer and Brian Martin, 'The arguments about RSI: an examination', *Community Health Studies*, Vol. 12, No. 3, 1988, pp. 348-358.

Brian Martin, 'The sociology of the fluoridation controversy: a reexamination', *Sociological Quarterly*, Vol. 30, No. 1, 1989, pp. 59-76.

Brian Martin, 'Computing and war', *Peace and Change*, Vol. 14, No. 2, April 1989, pp. 203-222.

Brian Martin, 'Gene Sharp's theory of power', *Journal of Peace Research*, Vol. 26, No. 2, 1989, pp. 213-222.

• Colin Kearton and Brian Martin, 'Technological vulnerability: a neglected area in policy-making', *Prometheus*, Vol. 7, No. 1, June 1989, pp. 49-60.

Brian Martin, 'What should be done about higher education?', *Social Anarchism*, No. 14, 1989, pp. 30-39.

Brian Martin, 'Fraud and Australian academics', *Thought and Action*, Vol. 5, No. 2, Fall 1989, pp. 95-102.

Brian Martin, 'Fluoridation: the left behind?', *Arena*, No. 89, 1989, pp. 32-38.

Brian Martin, 'Democracy without elections', *Social Alternatives*, Vol. 8, No. 4, January 1990, pp. 13-18.

Submitted or accepted for publication

Pam Scott, 'Levers and counterweights: a laboratory that failed to raise the world', submitted to *Social Studies of Science*.

• Pam Scott, 'Whatever happened to electronic road pricing?', submitted to *Traffic Engineering and Control*.

• Pam Scott and Brian Martin, 'Automatic vehicle identification: a test of theories of technology', submitted to *Science, Technology and Human Values*.

Brian Martin, *Scientific Knowledge in Controversy: The Social Dynamics of the Fluoridation Debate* (Albany: State University of New York Press, in press).

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