

CURRICULUM VITAE

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Position: UCSF Postdoctoral Scholar

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1 EDUCATION

LeFevre High School, South Australia

1985 Pre-matriculation Mathematics I & II, Physics, Chemistry, English

1986 Matriculation Mathematics I & II, Physics, Chemistry, Economics

The Flinders University of South Australia

1991 B.Sc. (Honours) Psychology, Neuroscience, Computing, Statistics

1997 B.A. Philosophy, English

2001 Certificate Foundations of University Teaching

2005 Ph.D. Cognitive Neuroimaging (Electrophysiology)

2 KEYWORDS / AREAS OF INTEREST

psychology, cognition, emotion, learning, memory, attention, working memory, psychiatry, anxiety, depression, posttraumatic stress disorder (PTSD), neuropsychology, neuroimaging, psychophysiology, electrophysiology, electroencephalography (EEG), magnetoencephalography (MEG), electromagnetic source estimation, magnetic resonance imaging (MRI), functional magnetic resonance imaging (fMRI), magnetic resonance spectroscopy (MRS), neurophysiology, neuroanatomy, research methods, statistics, data analysis, database management, computer programming

3 ACADEMIC AND RESEARCH POSITIONS

The Flinders University of South Australia

- 1992 - 2003 Research Assistant, Cognitive Neuroscience Laboratory
(Directed by C. Richard Clark, Ph.D.; NHMRC and ARC grants)
- 1993 - 2003 Psychophysiology Tutor (in Psychology)
(Supervised by C. Richard Clark, Ph.D.)
- 2001 - 2003 Statistics Tutor (in Mathematics, using SPSS)
(Supervised by Alan Branford, Ph.D.)
- 2002 - 2003 Research Methods Tutor (in Psychology, using SPSS)
(Supervised by Geoffrey Fraser, Ph.D.)
- 2002 - 2003 Clinical Research Methods Tutor (in Medicine)
(Supervised by Carole Pinnock, MBBS, Ph.D.)
- 2002 - 2003 Flinders Foundation Course Tutor
An equal opportunity program at Flinders University
(Supervised by Vic Beasley, Ph.D.)

The University of California, San Francisco

- 2003 - 2007 Postdoctoral Research Scholar
Dynamic Neuroimaging Laboratory, Department of Radiology
(Directed by Gregory V. Simpson, Ph.D.; NIH grants)

Research Consulting

- 2002 - 2003 Flinders Human Behaviour & Health Research Unit
<http://som.flinders.edu.au/FUSA/CCTU/Home.html>
(Directed by Malcolm Battersby, MBBS, FRANZCP, Ph.D., FACHAM)
- 2005 - 2006 Neurobehavioral Research Inc.
<http://www.nbresearch.com/index.html>
(Directed by George Fein, Ph.D.; NIH grants)

4 HONORS AND AWARDS

- 1999: Flinders University Arthur Keain Staff Development Award, to attend the 10th World Congress of the International Society for Brain Electromagnetic Topography, Adelaide, Australia, 11 - 13th October, 1999.
- 2001: Australian Neuroimaging Consortium Travel Scholarship, 5th Australian Functional Brain Mapping Symposium, including SPM99 and EMSE training courses, Melbourne, 7 - 12th May, 2001.
- 2002: Early career research presentation award at the 1st Combined Meeting of the 12th Australasian Society for Psychophysiology Conference and the 6th Functional Brain Mapping Symposium, University of Sydney, Sydney, Australia, Nov 29 - Dec 3, 2002.
- 2004: Travel award to attend the joint meeting of the EEG and Clinical Neuroscience Society (ECNS) and The International Society for NeuroImaging in Psychiatry (ISNIP), the University of California, Irvine, September 29 - October 3, 2004.

5 PROFESSIONAL ACTIVITIES

5.1 Professional Organizations

5.1.1 Memberships

- 2007 US National Postdoctoral Association
- 2004-2007 Cognitive Neuroscience Society
- 2004-2006 Society for Neuroscience
San Francisco Bay Area Society for Neuroscience Chapter
- 2004-2005 EEG and Clinical Neuroscience Society (ECNS)
- 2004-2005 The International Society for NeuroImaging in Psychiatry (ISNIP)
- 1998-2004 Organization for Human Brain Mapping
- 1995-2002 Australasian Society for Psychophysiology

5.1.2 Service to Professional Organizations

- 1995-2000, Student Representative, Australasian Society for Psychophysiology
- 1998-2000, Treasurer, Australasian Society for Psychophysiology
- Local Organizing Committee, Australasian Society for Psychophysiology, 10th ASP Conference, Adelaide, Australia, December 2000.
- Local Organizing Committee, International Society for Brain Electromagnetic Topography: 10th World Congress of ISBET, Adelaide, Australia, October 1999.

5.1.3 Service to Professional Publications

- 2005 Biological Psychology, ad hoc review on PTSD research
- 2006 Archives of General Psychiatry, ad hoc review on PTSD research
- 2007 Neurocomputing, ad hoc review on PTSD research

5.2 Invited Presentations

5.2.1 International

None

5.2.2 National

None

5.2.3 Regional and Other Invited Presentations

- 2000** Department Colloquium, “Psychophysiology of Attention and Memory Processes in Post-traumatic Stress Disorder”, School of Psychology, The Flinders University of South Australia, October, 2000.
- 2001** Postgraduate Colloquium, “Cognitive Processes in Post-traumatic Stress Disorder”, School of Psychology, The Flinders University of South Australia, March, 2001.
- 2004** Cognitive Neuroscience Symposium, “Abnormal Working Memory in Post-traumatic Stress Disorder”, UCSF Department of Radiology, June, 2004.
- 2004** Research Symposium, “Cognitive Electrophysiology of Post-traumatic Stress Disorder”, UCSF Department of Psychiatry, Veterans Affairs Medical Center, July, 2004.
- 2005** CMFI Monthly Seminar Series, “MEG Brain Imaging of Cortical Networks Involved in Visual-Spatial Attention”, UCSF Center for Molecular and Functional Imaging, Dec, 2005.
- 2007** Cognitive Neuroscience Symposium, “Visual Selective Attention in Post-traumatic Stress Disorder”, UCSF Department of Radiology, June, 2007.
- 2007** Cognitive Neuroscience Symposium, “Covert Visual Orienting: Cortical Networks Evolve During Spatial Orienting and Preparation for Visual Discrimination”, UCSF Department of Radiology, July, 2007.

5.3 Professional Courses Attended

- 1998, fMRI Course/MEDx:** Tom Zeffiro, 1998, Melbourne, Australia.
- 1999, Multi-Modality Brain Imaging:** Richard Clark, John George, Jack Belliveau, Richard Greenblatt, Tom Zeffiro, October 1999, Adelaide, Australia.
- 1999, Functional Brain Imaging and SPM:** Gary Egan, John Watson, Aina Puce, February 1999, Melbourne, Australia.
- 2001, Electromagnetic Source Estimation:** Richard Greenblatt, May 2001, Melbourne, Australia.
- 2001, SPM99:** Matthew Brett, May 2001, Melbourne, Australia.
- 2002, SPM99:** Kalina Christoff, Nov 2002, Sydney, Australia.
- 2002, FreeSurfer:** Doug Greve, June 2002, Melbourne, Australia.
- 2002, FSL 3.0:** Steve Smith, Mark Jenkinson, Christian Beckmann, and Mark Woolrich, June 2002, Melbourne, Australia.
- 2003, FSL 3.1:** Steve Smith, Mark Jenkinson, Christian Beckmann, and Mark Woolrich, June 2003, Los Angeles, California USA.
- 2004, EEGLAB:** Arnaud Delorme, Julie Onton, Tzyy-Ping Jung, Scott Makeig. UCSD, La Jolla, Oct. 28-30, 2004.

5.4 University and Public Service

5.4.1 Flinders University of South Australia

2000 Flinders Medical Research Institute student representative

5.4.2 UNIVERSITY SERVICE

Departmental Service:

Computing systems administration for the Dynamic Neuroimaging Laboratory, in liason with Radiology Research Computing Services.

6 TEACHING AND MENTORING

6.1 Teaching Narrative

While a research assistant and PhD student at The Flinders University of South Australia, I was involved in various teaching activities. In the first semester of 2003, I was involved in tutoring statistics and cognitive neuroscience. Since arriving at UCSF in June 2003, research has been the focus of my work. Although there are few opportunities for classroom teaching, I have been active in advising and reviewing research with collaborators in the department of radiology, along with UC Berkeley fellows and faculty also.

6.2 Teaching Awards and Nominations

2001 **The Flinders University of South Australia**
Certificate in Foundations of University Teaching

6.3 Undergraduate Teaching

6.3.1 Flinders University of South Australia

1993 - 2003: Cognitive Neuroscience Undergraduate and postgraduate instruction in psychophysiology and cognitive neuroscience, including classroom and laboratory teaching; Duties included: (a) instruction in cognitive neuroscience, especially anatomy, neurophysiology and sensory systems; (b) demonstrating and supervising psychophysiology equipment and experiments (EMG, EEG, ERP, MRI, fMRI); (c) designing practical exercises and handout materials, and (c) examinations (research report assessment, setting multiple choice exams, marking, and summarizing results).

2001 - 2003: Research Methods and Statistics Undergraduate classroom and online instruction in research methods and statistical analysis with SPSS. Topics covered include: philosophy of science, research designs and experimental concepts and methods, clinical research

programmes, descriptive statistics, correlation and bivariate/multivariate regression, and inferential statistics (Student's t and ANOVA).

2002 - 2003: Flinders Foundation Courses This was part of an equal opportunity program at Flinders University, directed by Dr. Vic Beasley, to encourage adult students and minorities into higher education. The courses are designed to fulfill equity objectives in higher education, with facilitated transitions into higher education. For more details about the foundation program, please see <http://www.flinders.edu.au/students/future/specialaccess/foundation.html> I was involved in teaching for a couple of foundation topics:

- *Learning to Use Quantitative Methods*: I was involved in several tutorial groups with 20-30 students learning quantitative methods. This was a structured series of classes with progressive assessment of both home assignments and classroom tests. The purpose of the topic was to expose students to problems which require quantitative solutions and to build confidence in their ability to think in this way. The topic covered the following themes:
 - the uses of mathematics in our lives
 - mathematics as an unfamiliar language
 - problem solving literacy
 - the uses of the calculator
 - numeracy and algebra
 - the process of problem solving
 - graphs and statistics

The topic placed emphasis upon developing the ability to examine critically the evidence presented by others using quantitative methods.

- *An Introduction to a Study of the Social Sciences*: This topic introduced students to a wide range of issues in the Social Sciences. The topic comprised a number of Social Science approaches to the study of the world in which we live. These explored issues of human relationships and human interaction with the environment - in the past and in the contemporary world. Each week a lecturer discussed the way in which their discipline explains problems and then examined a particular question - sometimes from their own research interests. In the light of the lecture, a tutorial considered assigned readings for the topic. The tutorial discussions, and a short essay written at the conclusion of the topic, enabled students to practise the academic skills they develop in earlier topics.

6.4 Postgraduate and Other Courses

2004: UCSF Radiology Programming Series: An Introduction to Matlab Covered Matlab components, interactive calculations, getting help, data types, vector and matrix initialization, indexing, and computations, linear algebra, 2D/3D graphics, file I/O, statistics, image processing (with DICOM), scripts and functions.

6.5 Student Supervision

6.5.1 Students Advised

| Dates | Name | Mentored Position | Mentoring Role | Current Position |
|-----------|-----------------|--------------------|---|--------------------------------|
| 2003 | Tim Zubansky | Student Volunteer | Research Advisor | - |
| 2003-2004 | Morgan G. Hough | Research Assistant | Research Advisor Informal Career Advisor | PhD Student (Oxford) |
| 2003-2004 | Nicole Gitcho | Research Assistant | Research Advisor Informal Career Advisor | - |
| 2003-2007 | Sarang Daalal | PhD Student | Informal Research Advisor Informal Qualls Review | Postdoctoral Scholar (Lyon) |
| 2003-2007 | Johanna Zumer | PhD Student | Informal Research Advisor Informal Qualls Review | PhD Student |
| 2004-2005 | Tania Boniske | Student Volunteer | Research Advisor | - |
| 2005 | Alex Wu | Medical Student | Research Advisor | Medical Student |

6.5.2 Postdoctoral Fellows and Residents Advised

| Dates | Name | Mentored Position | Mentoring Role | Current Position |
|-----------|-----------------------|-------------------------------------|---|---------------------|
| 2003-2005 | Corby L. Dale, Ph.D. | Postdoctoral Fellow | Research Collaborator Informal Career Advisor Data Analysis Advisor | Postdoctoral Fellow |
| 2003-2005 | Tracy L. Luks, Ph.D. | Postdoctoral Fellow | Informal Grant Review Data Analysis Advisor | Postdoctoral Fellow |
| 2004 | Ilana Hairston, Ph.D. | Postdoctoral Fellow | Data Analysis Advisor | Postdoctoral Fellow |
| 2005 | J. Mikael Eklund | UC Berkeley Postdoctoral Scholar | Research Advisor | Postdoctoral Fellow |

6.6 Faculty Collaborations

6.6.1 UCSF Faculty Advised

| Dates | Name | Mentored Position | Mentoring Role | Current Position |
|-----------|-------------------------------|-------------------------------------|---|---|
| 2003-2004 | Sven Prevrhal, Ph.D. | Assistant Adjunct Professor | Informal Research Advisor | Assistant Adjunct Professor |
| 2003-2006 | Srikantan S. Nagarajan, Ph.D. | Associate Professor in Residence | Research Collaborator | Associate Professor in Residence |
| 2003-2006 | Thomas C. Ferree, Ph.D. | Assistant Adjunct Professor | Research Collaborator Informal Grant Review Informal Career Advisor | Assistant Professor (UT Southwestern) |
| 2003-2007 | Gregory V. Simpson, Ph.D. | Associate Adjunct Professor | Research Collaborator Informal Grant Review | Associate Adjunct Professor |
| 2006-2007 | Adam Gazzaley, M.D., Ph.D. | Associate Professor | Research Collaborator | Associate Professor |

6.6.2 Other Visiting Faculty Advised

| Dates | Name | Mentored Position | Mentoring Role | Current Position |
|-----------|------------------|------------------------------|-----------------------|------------------------------|
| 2003-2004 | Alex Wade, Ph.D. | Stanford Assistant Professor | Research Collaborator | Stanford Assistant Professor |

6.7 Summary of Teaching Hours

6.7.1 Previous Academic Year

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|--|-----------|
| Formal class or course teaching hours: | 0 hours |
| Informal teaching hours: | 25 hours |
| Advising hours: | 150 hours |
| Total hours of teaching (including preparation): | 175 hours |

6.7.2 Current Academic Year

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|--|-----------|
| Formal class or course teaching hours: | 0 hours |
| Informal teaching hours: | 20 hours |
| Advising hours: | 200 hours |
| Total hours of teaching (including preparation): | 220 hours |

6.7.3 Next Academic Year

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|--|-----------|
| Formal class or course teaching hours: | 0 hours |
| Informal teaching hours: | 20 hours |
| Advising hours: | 200 hours |
| Total hours of teaching (including preparation): | 220 hours |

7 Research Awards and Grants

7.0.4 Current

No current funding

7.0.5 Pending

None

7.0.6 Past Awards

- 2004: \$600, Travel award to attend the joint meeting of the EEG and Clinical Neuroscience Society (ECNS) and The International Society for NeuroImaging in Psychiatry (ISNIP), the University of California, Irvine, Sep 29 – Oct 3, 2004.

- 2003: \$5,000, Flinders University Thesis Write-up Stipend.
- 2001: \$750, Australian Neuroimaging Consortium Travel Scholarship, to attend the 5th Australian Functional Brain Mapping Symposium, including SPM99 and EMSE courses, Melbourne, 7–12th May, 2001.
- 1999: \$1,000, Flinders University Arthur Keain Staff Development Award, to attend the 10th World Congress of the International Society for Brain Electromagnetic Topography, Adelaide, Australia, 11–13th October, 1999.

7.0.7 Past Applications

- 2006: Life Sciences Research Foundation, Postdoctoral Fellowship - Functional Neuroimaging of Attention and Working Memory Systems in Post-traumatic Stress Disorder. The application was not successful.
- 2006: UCSF Sandler Postdoctoral Scholarship - Imaging Functional Connectivity of Neural Networks During Working Memory Processes in Post-traumatic Stress Disorder. The application was not successful.

8 Peer Reviewed Publications

8.1 B.Sc.(Hons.) Thesis

Weber (1991): Weber, D. L. (1991). Event-related potential indices of attention in post-traumatic stress disorder and panic disorder. B.Sc.(Hons.) Thesis, School of Psychology, The Flinders University of South Australia, GPO Box 2100, Adelaide SA 5001, Australia.

8.2 Ph.D. Thesis

Weber (2004): Weber, D. L. (2004). Event-related potential indices of attention and memory in post-traumatic stress disorder. Ph.D. Thesis, School of Psychology, The Flinders University of South Australia, GPO Box 2100, Adelaide SA 5001, Australia.

8.3 Articles in Progress

1. Pantazis, D., Simpson, G. V., **Weber, D. L.**, Dale, C. L., Nichols, T. E., Leahy, R. M. Top-down control mechanisms of visual attention in an MEG study of a spatial cueing paradigm. *Neuroimage*, in preparation.
2. **Weber, D. L.**, Dale, C. L., Simpson, G. V., Ferree, T. C., Luks, T. L. Covert spatial attention: Cortical modulations for anticipation of visual discriminations. *Cerebral Cortex*, in preparation.
3. **Weber, D. L.**, Clark, C. R., McFarlane, A. C., Krust-McKay, M. Auditory-verbal learning in post-traumatic stress disorder. *The Clinical Neuropsychologist*, in preparation.

4. **Weber, D. L.**, Clark, C. R., McFarlane, A. C., Morris, P. & Egan, G. Visual selective attention in post-traumatic stress disorder. *Psychiatry Research*, in preparation.
5. **Weber, D. L.** Information processing bias in post-traumatic stress disorder. *Biological Psychology*, in revision.

8.4 Articles Published

1. * McFarlane, Weber, and Clark (1993):
McFarlane, A. C., **Weber, D. L.**, & Clark, C. R. (1993, Sep). Abnormal stimulus processing in posttraumatic stress disorder. *Biological Psychiatry*, 34(5), 311–320.
Note: This paper was a result of my B.Sc.(Hons.) thesis. For this paper, I was responsible for data acquisition, analysis, and reporting. I contributed substantial writing for all sections of this paper (the method and results sections were entirely my work). The project was conceived by Prof. McFarlane and Dr. Clark; Prof. McFarlane is the first author for project conception and substantial writing for the introduction and discussion sections.
2. * Clark, McFarlane, Weber, and Battersby (1996):
Clark, C. R., McFarlane, A. C., **Weber, D. L.**, & Battersby, M. (1996, May). Enlarged frontal P300 to stimulus change in panic disorder. *Biological Psychiatry*, 39(10), 845–856.
Note: This paper was a result of my B.Sc.(Hons.) thesis. For this paper, I was responsible for data acquisition, analysis, and reporting. I contributed substantial writing for the method and results sections. The project was conceived by Prof. McFarlane and Dr. Clark; Dr. Clark is the first author here for project conception and substantial writing for the introduction and discussion sections.
3. Galletly, Clark, McFarlane, and Weber (1997):
Galletly, C. A., Clark, C. R., McFarlane, A. C., & **Weber, D. L.** (1997, Oct). Relationships between changes in symptom ratings, neuropsychological test performance and quality of life in schizophrenic patients treated with clozapine. *Psychiatry Research*, 72(3), 161–166.
Note: For this paper, I supported a PhD student (Galletly), which involved substantial work on all aspects of data acquisition, analysis, and reporting. My contribution to this paper was collection and analysis of neuropsychology measures of cognitive processes.
4. Clark, Orr, Wright, and Weber (1998):
Clark, C. R., Orr, R. S., Wright, E. K., & **Weber, D. L.** (1998). Working memory updating to visual verbal stimuli: A high resolution ERP study. In Y. Koga, K. Nagata, & K. Hirara (Eds.), *Brain Topography Today* (pp. 173–178). Tokyo: Elsevier Science.
Note: For this paper, I supported two honours students conducting their research theses (Orr and Wright), which involved substantial work in all aspects of research design, data acquisition, analysis, and reporting. This paper summarized part of that work and authorship acknowledges my general contributions to the project.

5. Clark, Egan, et al. (1998):

Clark, C. R., Egan, G. F., McFarlane, A. C., Morris, P., **Weber, D. L.**, Sonkilla, C., & Soda, J. (1998). A high resolution ERP and PET investigation of verbal working memory. *Brain Topography*, 11(1), 80–81.

Note: This paper is related to my Ph.D. thesis project. My thesis focused on EEG/ERP measures; this paper reports related aspects of both ERP and PET measures of cognition in PTSD. For this paper, my contributions involved work in research design and ERP data acquisition, analysis and reporting. The analysis and reporting of PET results was carried out by others (Egan and Sonkilla). Authorship acknowledges my formative contributions to this project and contributions to the ERP aspects of the paper.

6. Galletly, Clark, McFarlane, and Weber (1999):

Galletly, C. A., Clark, C. R., McFarlane, A. C., & **Weber, D. L.** (1999, Jan). Effects of clozapine for non-treatment-resistant patients with schizophrenia. *Psychiatric Services*, 50(1), 101–103.

Note: For this paper, I was supporting a PhD student (Galletly), which involved all aspects of data acquisition, analysis, and reporting. My contribution to this paper involved collection, analysis and reporting of neuropsychology measures of cognitive processes.

7. Galletly, Clark, McFarlane, and Weber (2000):

Galletly, C. A., Clark, C. R., McFarlane, A. C., & **Weber, D. L.** (2000, Nov). The effect of clozapine on the speed and accuracy of information processing in schizophrenia. *Progress in Neuropsychopharmacology and Biological Psychiatry*, 24(8), 1329–1338.

Note: For this paper, I was supporting a PhD student (Galletly), which involved all aspects of data acquisition, analysis, and reporting. My contribution to this paper involved collection, analysis and reporting of all measures of cognitive processes.

8. * Clark et al. (2000):

Clark, C. R., Egan, G. F., McFarlane, A. C., Morris, P., **Weber, D. L.**, Sonkilla, C., Marcina, J. & Tochon-Danguy, H. J. (2000). Updating working memory for words: A PET activation study. *Human Brain Mapping*, 9(1), 42–54.

Note: This paper is related to my Ph.D. thesis project. My thesis focused on EEG/ERP measures, while this paper reports related PET measures of cognition in normal control subjects. For this paper, my contributions involved work in research design and data acquisition. The analysis and reporting of PET results was carried out by others (Egan and Sonkilla). Authorship acknowledges my formative contributions to this project and to writing of several sections in the paper.

9. * Galletly, Clark, McFarlane, and Weber (2001):

Galletly, C. A., Clark, C. R., McFarlane, A. C., & **Weber, D. L.** (2001, Apr). Working memory in posttraumatic stress disorder — an event-related potential study. *Journal of Traumatic Stress*, 14(2), 295–309.

Note: For this paper, I supported a PhD student (Galletly) on a thesis project. I was involved in all aspects of data acquisition, analysis, and reporting. My contribution to this paper was collection, analysis and reporting of ERP measures of cognition for the method and results

sections.

10. Clark et al. (2001):

Clark, C. R., Moores, K. A., Lewis, A., **Weber, D. L.**, Fitzgibbon, S., Greenblatt, R., Brown, G. & Taylor, J. (2001, Oct). Cortical network dynamics during verbal working memory function. *International Journal of Psychophysiology*, 42(2), 161–176.

Note: In this project, I contributed advice and analysis assistance to investigation of methods for ERP source estimation and analysis, using cortically constrained, distributed source models, applied to ERP activity related to working memory processes. I was involved in most aspects of research design, EEG/MRI data acquisition, analysis, and reporting.

11. * Clark et al. (2003):

Clark, C. R., McFarlane, A. C., Morris, P., **Weber, D. L.**, Sonkkilla, C., Shaw, M., Marcina, J., Tochon-Danguy, H. J. & Egan, G. F. (2003, Mar). Cerebral function in posttraumatic stress disorder during verbal working memory updating: a positron emission tomography study. *Biological Psychiatry*, 53(6), 474–481.

Note: This paper is related to my Ph.D. thesis project. My thesis focused on EEG/ERP measures, while this paper reports related PET measures of cognition in PTSD. For this paper, my contributions involved work in research design and data acquisition, plus contributions to several sections of the paper.

12. Moores et al. (2003):

Moores, K. A., Clark, C. R., Hadfield, J., Brown, G. C., Taylor, D. J., Fitzgibbon, S. P., Lewis, A. C., **Weber, D. L.** & Greenblatt, R. (2003, Jan). Investigating the generators of the scalp recorded visuo-verbal P300 using cortically constrained source localization. *Human Brain Mapping*, 18(1), 53–77.

Note: As in Clark et al. (2001), I contributed advice and analysis assistance to investigation of methods for ERP source estimation and analysis, using cortically constrained, distributed source models, applied to P300 ERP activity in this paper. I was involved in most aspects of research design, EEG/MRI data acquisition, analysis, and reporting.

13. * Weber et al. (2005):

Weber, D. L., Clark, C. R., McFarlane, A. C., Morris, P., & Egan, G. F. (2005, Oct). Abnormal frontal and parietal activity during working memory updating in post-traumatic stress disorder. *Psychiatry Research*, 140(1), 27–44.

Note: This paper is part of my Ph.D. thesis project. For this paper, I was primarily responsible for all aspects of research design, data acquisition, analysis, reporting and publication.

8.5 Conference Abstracts

1. **Weber, D. L.**, Clark, C. R., McFarlane, A. C., Galletly, C. A. (1995). Event-related potential indices of executive attention and working memory in post-traumatic stress disorder.

Oral presentation at 5th Australasian Psychophysiology Conference, Wollongong, Australia, December, 1995.

2. Powers, D. M., Clark, C. R., Dixon, S. E., **Weber, D. L.** (1996). Cocktails and brainwaves: Experiments with complex and subliminal auditory stimuli. Proceedings of the IEEE Australia New Zealand Intelligent Information Systems Conference, Adelaide, Australia, November, 1996.
3. Clark, C. R., Orr, R. S., Wright, E. K., **Weber, D. L.** (1997). Working memory updating to visual verbal stimuli: a high-resolution ERP study. Proceedings of the III PAN-PACIFIC Conference on Brain Topography, Tokyo, Japan, April, 1997.
4. Galletly, C. A., Clark, C. R., McFarlane, A. C., **Weber, D. L.** (1997). The effect of clozapine on information processing in schizophrenia. Sixth World Congress of Biological Psychiatry, Nice, France, June, 1997. *Biological Psychiatry*, 42(1, Suppl. 1): 141S.
[http://dx.doi.org/10.1016/S0006-3223\(97\)87477-X](http://dx.doi.org/10.1016/S0006-3223(97)87477-X)
5. Clark, C. R., Egan, G. F., McFarlane, A. C., Morris, P., **Weber, D. L.**, Becker, P., Soda, J., Ellen, S., McKay, W. J., Tochon-Danguy, H. (1997). PET/ERP correlational studies of cognitive deficits in PTSD patients. Second Australian Symposium on Functional Brain Mapping, Melbourne, Australia, February, 1997.
6. Clark, C. R., McFarlane, A. C., Egan, G., Morris, P., **Weber, D. L.**, Tochon-Danguy, H., Clark, M., MacKay, J., Soda, J., Becker, P. (1997). Combined functional imaging of working memory. Proceedings of the 7th Australasian Psychophysiology Conference, Melbourne, 1997.
7. Clark, Brown, Weber, and Taylor (1997) Clark, C. R., Brown, G. C., **Weber, D. L.**, Taylor, D. J. (1997). Investigating brain source dynamics using combined functional imaging methods. In R.S. Silberstein (ed), Proceedings of the Brain Sciences Symposium, Melbourne, Australia.
8. McFarlane, A. C., Galletly, C. A., Clark, C. R., **Weber, D. L.**, Egan, G. F., Morris, P. (1997). Information processing of neutral stimuli in PTSD. International Society for Traumatic Stress Studies Conference, Montreal, Canada, November, 1997. Invited speaker.
9. **Weber, D. L.**, Clark, C. R., McFarlane, A. C. (1997). High resolution event-related potential indices of working memory in post-traumatic stress disorder. Oral presentation at 7th Australasian Psychophysiology Conference, Melbourne, Australia, December, 1997.
10. Clark, C. R., Egan, G. F., McFarlane, A. C., Morris, P., **Weber, D. L.**, Sonkilla, C., Marcina, J. (1998). Verbal working memory in post-traumatic stress disorder: a combined PET and high-resolution ERP study. Third Australian Symposium on Functional Brain Mapping, Melbourne, Australia, April, 1998.
11. Clark, C. R., Egan, G. F., McFarlane, A. C., Morris, P., **Weber, D. L.**, Sonkilla, C., Marcina, J. (1998). Abnormal functional anatomy of verbal working memory in post-traumatic stress disorder. World Congress of Stress, Melbourne, Australia, October, 1998. Invited speaker.

12. Clark, C. R., Egan, G. F., McFarlane, A. C., Morris, P., **Weber, D. L.**, Sonkilla, C., Marcina, J., Tochon-Danguy, H. (1998). Updating working memory for words: a PET and high resolution ERP study. Fourth International Conference on Functional Mapping of the Human Brain, Montreal, Canada, June, 1998.
13. Clark, C. R., **Weber, D. L.**, Egan, G. F., McFarlane, A. C., Morris, P., Sonkilla, C., Marcina, J., Tochon-Danguy, H. (1998). Assessment of working memory function in post-traumatic stress disorder using positron emission tomography and event-related potentials. Oral presentation at 8th Australasian Psychophysiology Conference, Brisbane, Australia, December, 1998.
14. **Weber, D. L.**, Clark, C. R., McFarlane, A. C., Morris, P., Marcina, J. (1998). High resolution ERP indices of stimulus selection and evaluation in post-traumatic stress disorder. Oral presentation at 8th Australasian Psychophysiology Conference, Brisbane, Australia, December, 1998.
15. Clark, C. R., Orr, R. S., **Weber, D. L.**, Moores, K., Lewis, A., Pomeroy, D., Fitzgibbon, S., Taylor, J., Brown, G., Egan, G., McFarlane, A. C., Puce, A. (1999). Differentiating working memory processes using multimodal imaging. 10th World Congress of the International Society for Brain Electromagnetic Topography, Adelaide, Australia, 11 - 13th October, 1999, *Brain Topography*, 12(4), 2000: 303-319.
16. Clark, C. R., Moores, K., Lewis, A., **Weber, D. L.**, Taylor, J., Brown, G., Egan, G., McFarlane, A. C., Puce, A. (1999). An investigation of goal-setting in working memory using fMRI. Fourth Australian Functional Brain Mapping Symposium, Adelaide, Australia, October, 1999.
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8.6 Open Source Scientific Software

EEG toolbox : A matlab toolbox for ERP analysis and visualization, including realistic 3D scalp models and interpolation; distributed from <http://eeg.sf.net>

CTF toolbox : A matlab toolbox for analysis of MEG/EEG and MRI data from the Omega 2000, 275/128 channel MEG/EEG system of CTF Systems Inc. (Port Coquitlam, BC, Canada); distributed from <http://eeg.sf.net>

MRI toolbox : A matlab toolbox for analysis and visualization of MRI data, particularly good for working with the Analyze 7.5 file format; distributed from <http://eeg.sf.net>

BrainStorm toolbox : A matlab toolbox for analysis and visualization of EEG/MEG and MRI data. I have made consistent contributions to alpha testing and development of these tools since 2002. The toolbox is distributed from <http://neuroimage.usc.edu>

MEDx tcl scripts for automated fMRI analysis

Neuroscan scripts for automated ERP analysis with Neuroscan software; distributed from <http://eeg.sf.net>

Perl utilities for processing EEG and ERP data; distributed from <http://eeg.sf.net>

9 RESEARCH PROGRAM

My research at Flinders was concerned with the neurophysiological basis of cognitive dysfunction in psychopathology. In particular, I have been involved in the collection, analysis, and evaluation of high density event-related potentials (ERPs), positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) during attention and working memory tasks in post-traumatic stress disorder (PTSD), panic disorder, and schizophrenia. This work involved developing a research program into multimodal brain imaging (using 124 channel ERPs, PET, and fMRI). This research program involved collaboration with the Department of Psychiatry at Adelaide University, the National Center for War-Related PTSD and the Austin Hospital PET Center in Victoria, and the Royal Adelaide Hospital, Department of Nuclear Medicine and MRI suite.

9.1 Research Experience

After completing a B.Sc.(Hon's), I worked as a research assistant in the Cognitive Neuroscience Laboratory at the Flinders University of South Australia. This was initially to complete work on publications arising from the honors thesis. The position continued from 1992-2002, while I was working on a thesis project. During these 10 years, especially after 1995, the laboratory made a transition from 16 EEG channels into a sophisticated brain imaging laboratory, incorporating 128 EEG channels (Neuroscan SYNAMP) and anatomical and functional MRI (Siemens Magnetom 1.5T). Furthermore, these acquisition methods comprised the basis for investigation of multimodal integration and brain source estimation. I was involved in the challenging tasks of management for all aspects of the technical facilities, especially task designs, multimodal data collection and analysis (including computing infrastructure). The research involved coordinating work between several sites for EEG, PET and fMRI and many scientific collaborators. Duties included:

- EEG laboratory management, including occupational health and safety, hygiene and sterile procedures, computer equipment, data backup and management, software programming and maintenance
- applications of peripheral physiological apparatus (for heart rate, blood pressure, EMG, & EDA)
- preparation of research grant applications to the National Health and Medical Research Council of Australia, the Australian Research Council, the US National Institutes of Health, and various US foundations.
- preparation and submission of applications for ethical approval of research projects to institutional research ethics committees.
- liaison with health professionals, research students, and experimental subjects, including co-ordination of meetings and appointments
- administration and scoring of psychological questionnaires (e.g., Spielberger State-Trait Anxiety Inventory, Beck Depression Inventory) to normal subjects and several patient groups.
- supervised administration and scoring of neuropsychological assessments (e.g., National Adult Reading Test - Revised and Weschler Adult Intelligence Scale sub-tests) for normal subjects and several patient groups.

- design and implementation of ERP, PET, and fMRI tasks that probe attention and working memory
- collection of ERP measures of attention and memory in normal subjects and several patient groups.
- collection and analysis of PET/SPECT and fMRI measures of attention and memory in normal subjects and patient groups.
- statistical analyses of neuropsychological and neuroimaging data (using Microsoft Excel, SPSS in Unix or PC Windows, and various fMRI software, such as Stimulate, MEDx, SPM, and FSL)
- preparing scientific reports for journals and conferences, which includes:
 - location, retrieval, and review of literature
 - collaboration on drafting manuscripts, including (a) theoretical discussions and interpretation of results, (b) revisions on data analysis, (c) drafting methods and results sections (including high-resolution graphics)
 - analysis of results, incorporating summary and inferential statistics (noted in the text, graphs and tables)
 - checking references (and using bibliography software)
 - formatting and reformatting manuscripts for submission
 - liason with publishers (incl. proofs accepted manuscripts)

9.2 Equipment/Software Familiarity

9.2.1 High-resolution EEG/MEG Tools

- ECI electrocaps and Neuroscan QuikCap (128 channel applications)
- Neuroscan SynAmp and NuAmp; Neuroscan software (SCAN, ESI-128, STIM, 3D-SPACE)
- CTF 275/128 channel MEG/EEG data acquisition system and analysis software
- POLHEMUS Fastrak point and surface digitiser
- EEGLAB matlab toolbox
- I develop ERP/MRI matlab tools, see <http://eeg.sf.net>

9.2.2 Structural and Functional Brain Imaging Tools

- Familiarity with physical principles of PET and MRI
- Development of cognitive task designs for multi-modal brain imaging (ERP, PET, fMRI)
- MRI protocols for Siemens, GE and Phillips scanners

- Familiarity with several medical image formats
- MEDx, SPM, AIR, FSL, MGH-FreeSurfer software for MRI, PET and fMRI image analysis
- I develop an MRI matlab toolbox, see <http://eeg.sf.net>

9.2.3 Multi-modal Integration and Source Estimation

- EMSE, MRVU and BrainStorm software for EEG and fMRI integration and source modeling

9.2.4 Scientific Computing Skills

- Intermediate/Advanced Unix (Linux, SunOS/Solaris, Digital Unix)
- Intermediate shell scripting (csh, bash, dos)
- Intermediate programming (c/c++, Java, Pascal, Fortran, Perl, Tcl/Tk)
- Scientific programming languages (Matlab, IDL)
- Intermediate/Advanced Skills with Microsoft Office (eg, Visual Basic macro programming)
- Image and Graphics Processing (Adobe suite, The Gimp)
- Statistics - The R Project, SPSS, MS-Excel
- Database management (MySQL, MSaccess/SQL and associated APIs)
- Data management hardware and software (DAT tape, CD-R, DVD, tar, cpio, gzip)
- Networking (client/server software, http, javascript, cgi, java, telnet/ssh, FTP/scp, email)

9.3 Research Projects Completed

9.3.1 Auditory Attention in Post-traumatic Stress Disorder

This study was designed to investigate attention processes in post-traumatic stress disorder and panic disorder. My role in this project was to acquire and evaluate ERP measures of attention. We employed a 3 tone discrimination task, which required a button press to rare target stimuli. Essentially, we found a delayed N2 and a smaller P3 in PTSD, but a larger P3 in panic disorder for relevant target stimuli.

1. Weber (1991)
2. McFarlane et al. (1993)
3. Clark et al. (1996)
4. Galletly et al. (2001)

9.3.2 Schizophrenia Clozapine Project

This project was designed to evaluate the effects of clozapine in schizophrenia. My role in this study was to acquire and analyze neuropsychology and psychophysiology data, before and 6 months after clozapine treatment. We found that all patients responded to clozapine, demonstrating improved symptoms, quality of life and neuropsychological performance.

1. Galletly et al. (1997)
2. Galletly et al. (1999)
3. Galletly et al. (2000)
4. Galletly, Clark, and McFarlane (2005)
5. Galletly, Macfarlane, and Clark (2007)

9.3.3 Multimodal Brain Imaging Project

This project involved estimates of cortical source activity, based on integration of EEG, PET and/or fMRI measures. This work employed MRI data to create realistic boundary element models of cerebral tissues, which were used to calculate lead fields and associated inverse solutions for scalp ERP activity. The source space is constrained to the cortical surface and the PET or fMRI measures could be used to weight the probability of a given cortical area contributing to the scalp ERP measures. My contributions to this project involved a lot of technical developments in study design, data acquisition and analysis.

1. Clark et al. (1997)
2. Clark, Orr, et al. (1998)

3. Clark et al. (2001)
4. Moores et al. (2003)

9.3.4 Ph.D. Thesis

Weber, D. L. (2004). Event-related potential indices of attention and memory in post-traumatic stress disorder. Ph.D. Thesis, School of Psychology, The Flinders University of South Australia, GPO Box 2100, Adelaide SA 5001, Australia.

- Supervisor: C. Richard Clark, Ph.D.; richard.clark@flinders.edu.au
- Co-Supervisor: Alexander C. McFarlane, BMBS, MD; alexander.mcfarlane@adelaide.edu.au
- Assessment Advisor: Linda Metzger, Ph.D.; linda_metzger@hms.harvard.edu
- Assessment Advisor: Richard Bryant, Ph.D.; r.bryant@unsw.edu.au

The thesis project investigated ERP and PET measures of cognitive processes in post-traumatic stress disorder (PTSD). It was a significant development of work in the area. After publication of earlier work, we and several other groups replicated and extended findings of abnormal attention for non-traumatic information in PTSD (see McFarlane, Weber and Clark [1993], *Biological Psychiatry*, 34: 311-320). The thesis developed this area of work in two ways: (a) it used high-resolution ERPs (128 channels) and new methods of topographic analysis, and (b) it examined several components of cognitive function in PTSD, including selective attention, working memory, and target detection. The following articles have been published from this project.

1. Clark, Egan, et al. (1998)
2. Clark et al. (2000)
3. Clark et al. (2003)
4. Weber (2004)
5. Weber et al. (2005)

9.4 Current Research Projects

9.4.1 Investigating Visual Spatial Attention with MEG

I have worked on this project at the UCSF Dynamic Neuroimaging Laboratory (see <http://dnl.ucsf.edu/>). The work is supervised by Dr. Gregory Simpson, who funds the project from an NIH grant entitled, 'Network for the Study of Brain Systems and Dynamics'. My contribution is to integrate and develop software tools for cortically constrained electromagnetic source estimation, applied to visual spatial attention processes. This work has resulted in the following conference presentations (journal manuscripts are in progress):

1. Pantazis et al. (2004): Pantazis, D., Dale, C. L., **Weber, D. L.**, Hough, M. G., Nichols, T. E., Simpson, G. V., Leahy, R. M. (2004), Imaging and detection of oscillatory activity in MEG using time-frequency analysis and permutation tests. BIOMAG, August 8-12, 2004, Boston, MA, USA.
2. Weber et al. (2004): **Weber, D. L.**, Dale, C. L., Gitcho, N., Hough, M. G., Martin, A. J., Luks, T. L., Ferree, T. C., Simpson, G. V. (2004), Spatio-temporal activity in cortical networks for deployment of visual spatial attention: cortically constrained source estimation from magnetoencephalography. 34th Annual Meeting of the Society for Neuroscience, San Diego, California, October 23-27, 2004.
3. Pantazis et al. (2005): Pantazis, D., **Weber, D. L.**, Dale, C. L., Nichols, T. E., Simpson, G. V., Leahy, R. M. (2005, Mar). Imaging of oscillatory behavior in event-related MEG studies. In C. A. Bouman and E. L. Miller (Eds.), Proceedings of SPIE: Computational imaging III (Vol. 5674, pp. 55–63). San Jose, CA, USA: SPIE.
4. Ramirez et al. (2005): Ramirez, R. R., **Weber, D. L.**, Delorme, A., Dale, C. L., Simpson, G. V., Makeig, S. (2005). Cortical networks involved in directed spatial attention and target detection: recursive adaptive minimum-norm ICA source imaging. 35th Annual Meeting of the Society for Neuroscience, Washington, DC, 2005.
5. Weber, Simpson, Dale, Ferree, and Luks (2006): **Weber, D. L.**, Simpson, G. V., Dale, C. L., Wu, A., Ferree, T. C., Luks, T. L. (2006, April), MEG estimates of cortical event-related activity during covert orienting of visual spatial attention. Annual Meeting of the Cognitive Neuroscience Society, San Francisco, USA.
6. Simpson et al. (2006): Simpson, G. V., Pantazis, D., **Weber, D. L.**, Dale, C. L., Nichols, T. E., Leahy, R. M. (2006, April). Selective visual attention modulates cortical alpha activity to bias neural processing. Annual Meeting of the Cognitive Neuroscience Society, San Francisco, USA.
7. Bressler et al. (2006): Bressler, S. L., Sreenivasan, R., **Weber, D. L.**, Pantazis, D., Dale, C. L., Leahy, R. M., Simpson, G. V. (2006, Aug 20-26). Large-scale oscillatory networks of attention by cortically constrained MEG source estimation. 15th International Conference on Biomagnetism, Vancouver, BC, Canada.
8. Makeig et al. (2006): Makeig, S., Ramirez, R., **Weber, D. L.**, Wipf, D., Dale, C. L., Simpson, G. V. (2006, Aug 20-26). Current density distributions of independent sources during directed spatial attention computed by sparse Bayesian learning. 15th International Conference on Biomagnetism, Vancouver, BC, Canada.
9. Pantazis et al. (2006): Pantazis, D., Simpson, G. V., **Weber, D. L.**, Dale, C. L., Nichols, T. E., Leahy, R. M. (2006, Aug 20-26). Selective visual attention modulates cortical alpha activity to bias neural processing. 15th International Conference on Biomagnetism, Vancouver, BC, Canada.
10. Pantazis et al. (2007): Pantazis, D., Simpson, G. V., **Weber, D. L.**, Dale, C. L., Nichols, T. E., Leahy, R. M. (2007, April 12-15). Exploring Human Visual Attention in an MEG study of a spatial cueing paradigm using a novel ANCOVA design. Fourth IEEE International Symposium of Biomedical Imaging, Washington, DC, USA.

11. Weber et al. (2007): **Weber, D. L.**, Simpson, G. V., Dale, C. L., Ferree, T. C., Luks, T. L. (2006, Jan 19). Covert orienting of attention: Using MEG to estimate cortical activity timeseries. Society for Neuroscience: Bay Area Gathering, UCSF Mission Bay Campus, San Francisco, CA, USA.
12. Weber et al. (2007): **Weber, D. L.**, Simpson, G. V., Dale, C. L., Ferree, T. C., Luks, T. L. (2007, Jun 15-17). Covert orienting of attention: Cortical modulations for anticipation of visual discriminations. UC Systemwide Bioengineering Symposium, UCSF Mission Bay Campus, San Francisco, CA, USA.

9.4.2 Investigating Auditory Attention with MEG

I have worked on this project at the UCSF Dynamic Neuroimaging Laboratory (see <http://dnl.ucsf.edu/>). The work is supervised by Dr. Gregory Simpson, who funds the project from a UC Discovery grant, a joint project with Posit Science. The project began in late 2004. My contribution is to apply cortically constrained electromagnetic source estimation to an experiment on auditory attention. This work has resulted in the following conference presentations:

1. Luks, Dale, Weber, Zatorre, and Simpson (2007): Luks, T. L., Dale, C. L., **Weber, D. L.**, Zatorre, R. J., Simpson, G. V. (2007, June 10-14). MEG reveals dynamic cortical networks underlying auditory attention to linguistic and musical information. 13th International Conference on Human Brain Mapping, Chicago, Illinois, USA.

10 Professional References

Please email and telephone my advisors and collaborators, to discuss their experience of working with me:

Assoc. Prof. Richard Clark

richard.clark@flinders.edu.au

<http://www.ssn.flinders.edu.au/psyc/staff/RichardClark/>

Richard was my primary advisor from 1991-2003. Richard completed a PhD on catecholamines and attention systems in the late 1980's, after which he was appointed to a lecturer position in the School of Psychology at Flinders University. Richard established an EEG/ERP laboratory and I first started working there as an undergraduate student in 1990-1991. The work continued as a research assistant and later as a Masters/PhD research student.

Prof. Alexander McFarlane

alexander.mcfarlane@adelaide.edu.au

http://www.psychiatry.adelaide.edu.au/arstaff/mcfarlane_alexander.html

Richard and Sandy established a collaboration in 1988, which I became involved with in 1991. We published results of my thesis work in 1993 and 1996. I continued to work on their collaboration, which included studies of PTSD, panic disorder, schizophrenia and depression.

In the course of my work at Flinders, I have worked with several collaborators. I have published work with Cherrie Galletly and Kathryn Moores; please feel free to contact them also:

Dr. Cherrie Galletly

cherrie.galletly@adelaide.edu.au

http://www.psychiatry.adelaide.edu.au/arstaff/galletly_cherrie.html

Dr. Kathryn Moores

Kathryn.Moores@flinders.edu.au

<http://www.ssn.flinders.edu.au/psyc/students/KathrynMoores/>

For references on my recent collaborations, please contact present and past members of the UCSF Dynamic Neuroimaging Laboratory (see <http://dnl.ucsf.edu/>)

Dr. Gregory V. Simpson, greg.simpson@radiology.ucsf.edu

Dr. Thomas C. Ferree, tom.ferree@gmail.com

Dr. Corby Dale, Corby.Dale@radiology.ucsf.edu

Dr. Tracy Luks, Tracy.Luks@radiology.ucsf.edu

Greg Simpson has expertise in high resolution brain imaging and qualifications in clinical neuropsychology. I have worked with Tom Ferree on brain imaging methods; Tom has a PhD in mathematical physics and advised me on the fundamentals of electromagnetic brain imaging. I have also worked with Corby Dale and Tracy Luks, who have a PhD in psychology and several years of experience in cognitive neuroimaging.

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