

# CURRICULUM VITAE

Prof. Stephen Geoffrey Pyne

## PERSONAL DETAILS

**Date of birth/ birthplace** 27th April 1954; Melbourne, Australia

**Nationality** Australian

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University of Wollongong  
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## ACADEMIC QUALIFICATIONS

B.Sc. (Hons), University of Adelaide, 1975, Top first class honours, (Organic Chemistry)

Ph.D., Australian National University, 1979 (with Prof. L. N. Mander)

## AWARDS AND MEMBERSHIPS

### Awards

C.S.R. Chemistry Prize for Honours Chemistry 1975

Australian Commonwealth Postgraduate Scholarship, 1976-1979.

La Trobe University Research Fellowship 1983-1985

Deutsche Forschungsgemeinschaft Fellowship, 1988

Elected to Fellow of the Royal Australian Chemical Institute (FRACI), 1991

Von Humboldt Fellowship, 1992

Young Researcher of the Year Award for 1992 (offered by the Australian Research Council and the von Humboldt Foundation)

Rhone Poulenc Fellow under the Bede Morris Fellowship Scheme, 1994

ARC Senior Fellowship 1994-1998

Tasmanian Alkaloid Lectureship of the University of Tasmania, 2003.

## Memberships

Associate of the Royal Australian Chemical Institute 1984-1990.

Fellow of the Royal Australian Chemical Institute 1991-

## Editorial Board Membership

Member, Editorial Advisory Board of *Sulfur Letters* 1997-99.

Member, Editorial Advisory Board of *Sulfur Reports* 1997-99.

Managing Editor of *Sulfur Letters* 1999-2002

Managing Editor of *SulfurReports* 1999-2002

Associate Editor of *Mini Reviews in Organic Chemistry* 2002-current

Member, Editorial Advisory Board of *Current Organic Synthesis* 2002-current

Managing Editor of *Asian Coordinating Group for Chemistry (ACGC) Chem. Res. Commun.* 1996-2004.

Member, Editorial Advisory Board of *Asian Coordinating Group for Chemistry (ACGC) Chem. Res. Commun.* 2004-current.

Member, International Advisory Board of *Acta Manilana* 2002-current

Member, Editorial Advisory Board of *Natural Product Communications* 2006-

## POSITIONS HELD

Postdoctoral Research Fellow, Department of Chemistry, Purdue University, USA, with Prof. P. L. Fuchs, April 1979-June 1981.

Postdoctoral Research Fellow, Department of Chemistry, Harvard University, USA, with Prof. E. J. Corey, July 1981-July 1983.

Research Fellow, Department of Organic Chemistry, LaTrobe University, Victoria, October 1983 to January 1985.

Lecturer, Department of Chemistry, University of Wollongong, February 1985-1988.

Senior Lecturer, Department of Chemistry, University of Wollongong, February 1989-1992.

Assoc. Professor, Department of Chemistry, University of Wollongong, 1993-1997.

ARC Senior Research Fellow, Department of Chemistry, University of Wollongong, Jan 1994-Jan 1999.

Professorial Fellow, Department of Chemistry, University of Wollongong, 1997-1998.

Professor, Department of Chemistry, University of Wollongong, July 1998-present.

## VISITING FELLOWSHIPS/PROFESSORSHIPS

Von Humboldt Research Fellow, University of Marburg, Germany, host Prof. G. Boche, July 1992-Feb 1993,

Visiting Professor and Rhone Poulenc Fellow, University Louis Pasteur, Strasbourg, host Prof. G. Solladie, Jan-Feb 1994.

Visiting Professor, under the Bilateral Science and Technology Collaboration Program, Max Planck Institute fur Kohlenforschung, Mulheim, Germany, host Prof. A. Pfaltz, 1998.

Tasmanian Alkaloid Lectureship of the University of Tasmania, 2003.

## CONSULTANCIES

Subprogram Leader for Organic and Petrochemistry, Thai-Australian Science and Engineering Assistance Program (TASEAP), November 1998-2000.

## PROFESSIONAL ACTIVITIES

Chairman NSW Organic Chemistry Group of the Royal Australian Chemical Institute, 1999-2001.

Chair, National Organic Chemistry Group of the Royal Australian Chemical Institute, 2003-current.

## CURRENT UNIVERSITY ADMINISTRATION

Departmental Post-graduate coordinator 1990-205

Standing Acting Head of Chemistry 2000-2006

Acting Head of Chemistry July –December 2003

Coordinator Chem 212 and Chem 321

Have represented the Department of Chemistry on the Faculty Executive Committee, Faculty Research Committee and the Faculty Education Committee as Acting HOD or in the absence of the HOD or the Director of the Institute of Biomolecular Sciences.

<b>RESEARCH GRANTS (PAST 10 YEARS)</b>
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<b>Funding Body</b>	<b>Title</b>	<b>CIs</b>	<b>Year</b>	<b>Amount</b>
ARC	Senior ARC Fellowship	S.G. Pyne	1994-8	\$480,000
ARC Small Grant	Fullerenes	S.G. Pyne and P.A. Keller	1998-9	\$22,500
APA (Industry)	Synthesis of Immunosuppressive Agents	S.G. Pyne	1997-9	\$90,540
ARC Large Grant	Asymmetric Synthesis	S.G. Pyne	1998-2000	\$180,000
DIST	Travel grant to Germany	S.G. Pyne	1998	\$4,700
ARC Large Grant	Asymmetric Synthesis	S.G. Pyne	2000-3	\$180,000
ARC Discovery	Fullerenes	S.G. Pyne and P.A. Keller	2002-7	\$440,000
ARC Discovery	Asymmetric Synthesis	S.G. Pyne	2003-5	\$300,000
ARC Discovery	Asymmetric Synthesis	S.G. Pyne	2006-8	\$385,000
ARC LIEF [LE0346733]	Ultra-Sensitive CCD Diffractometer with High Intensity X-ray Photon Generator	T.W. Hambley <i>et al</i> (7)	2003	\$399,466
ARC LIEF	Biomacromolecular Interactions	N.E., Dixon <i>et al</i> (12)	2005	\$819,000
ARC LEIF	NMR Facility	S. G. Pyne et al	2006	\$470,000
NHMRC Development Grant/Amrad	Development of New Antibacterial Peptoids to Combat Antibiotic Resistant Bacteria.	J.B. Bremner, P.A. Keller and S.G. Pyne	2004	\$178,500
NHMRC Development Grant/Amrad	Development of New Antibacterial Peptoids to Combat Antibiotic Resistant Bacteria.	J.B. Bremner, P.A. Keller and S.G. Pyne	2006	\$178,500
UoW RIBG	NMR Autosampler	S.G. Pyne and J.B. Bremner	2004	\$60,000
URC Cancer Research Grants	Tyrindoleninone, a newly discovered marine cytotoxin as a novel anti-cancer agent and its potential for use in targeted cancer therapy.	M. Ranson, J.B. Bremner and S.G. Pyne	2004-5	\$97,587
URC Cancer Research Grants	Development of novel, potent and selective CDK2 enzyme inhibitors as potential anti-cancer therapeutic cancer agents.	S.G. Pyne and A.T. Ung	2004	\$10,000
UoW RIBG	Technical Support for NMR Spectroscopy	S. Pyne <i>et al.</i>	2004	\$44,000
Johnson and Johnson Research Pty. Limited	Synthesis and Design of Potential Pharmaceuticals	S.G. Pyne	1998-2004	\$1,050,000
Johnson and Johnson Research Pty. Limited	Drug Discovery	S.G. Pyne	2005-9	\$6,600,000
Avexa (AMRAD)	New Antibacterial Agents	J.B. Bremner, P.A. Keller and S.G. Pyne	1999-2005	\$912,000
<b>TOTAL RESEARCH GRANTS (past 10 years)</b>				<b>\$10,283,293</b>



## SUMMARY OF RESEARCH OUTPUTS

**Current Ph D students:** 6, plus 2 visiting PhDs from Thailand

**PhDs graduated:** 21, including 3 from Chiang Mai University

**Refereed journal publications:** 168

**Chapters in Books:** 7

**Patents:** 5

**National and International Scientific Lectures:** over 90

**National Conference Invited Lectures:** 6

**International Conference Invited Lectures:** 11

**International Conference Plenary Invited Lectures:** 4

## REFEREED JOURNAL PUBLICATIONS

1. 'A New Strategy for Gibberellin Synthesis', L.N. Mander and S.G. Pyne, *J. Am. Chem. Soc.*, **1979**, *101*, 3373-3375.
2. 'Synthetic Plant Growth Regulators III, The Preparation Gibberellic Acid Analogues with Gibberellin-like Properties', A.L. Cossey, L.N. Mander and S.G. Pyne, *Aust. J. Chem.*, **1979**, *32*, 817-822.
3. Cytocholasin Support Studies. Chiral and Stereochemical Control via an Intramolecular Diels-Alder Reaction of a Z-Diene', S.G. Pyne, M. Hensel, S.R. Byrn, A.T. McKenzie and P.L. Fuchs, *J. Am. Chem. Soc.*, **1980**, *102*, 5960-5962.
4. 'The Synthesis and Stereochemistry of Odorine', P.J. Babidge, R.A. Massy-Westropp, S.G. Pyne, D. Shiengthon, A. Ungphakorn and G. Veerachat, *Aust. J. Chem.*, **1980**, *33*, 1841-1845.
5. 'Studies on the Total Synthesis of Gibberellins. A New Strategy for A-Ring Construction', I.A. Blair, L.N. Mander, P.H.C. Mundill and S.G. Pyne, *Aust. J. Chem.*, **1981**, *34*, 1877-1898.
6. 'Studies on Gibberellin Synthesis. Assembly of an Ethanophenanthrenoid Lactone and Conversion into a Gibbane Derivative', L.N. Mander and S.G. Pyne, *Aust. J. Chem.*, **1981**, *34*, 1899-1911.
7. 'Studies on Gibberellin Synthesis. The Preparation of Phenanthrenoid Intermediates for the Synthesis of Gibberellin A<sub>21</sub>', L.N. Mander, G.J. Potter, S.G. Pyne and M. Woolias, *Aust. J. Chem.*, **1981**, *34*, 1913-1919.
8. 'Chiral and Stereochemical Control via Intramolecular Diels-Alder Reaction of Z-Dienes', S.G. Pyne, M.J. Hensel and P.L. Fuchs, *J. Am. Chem. Soc.*, **1982**, *104*, 5719-5728.
9. 'Cytocholasin Support Studies. Synthesis of a Chiral Cytocholasin C Intermediate', S.G. Pyne, D.C. Spellmeyer, S. Chen and P.L. Fuchs, *J. Am. Chem. Soc.*, **1982**, *104*, 5728-5740.

10. 'Synthesis of a New Series of Potent Inhibitors of Thromboxane A<sub>2</sub> Biosynthesis', E.J. Corey, S.G. Pyne and A.I. Schafer, *Tetrahedron Letters*, **1983**, 24, 3291-3294.
11. 'Conversion of Ketones Having  $\omega$ - $\epsilon$ - $\pi$ -Functions to Cyclopentanol by Zinc-Trimethylchlorosilane', E.J. Corey and S.G. Pyne, *Tetrahedron Letters*, **1983**, 24, 2821-2824.
12. 'Total Synthesis of Leukotriene B<sub>5</sub>', E.J. Corey, S.G. Pyne and W. Su, *Tetrahedron Letters*, **1983**, 24, 4883-4886.
13. 'Immunologically Induced Generation of Tetraene and Pentaene Leukotrienes in the Peritoneal Cavities of Menhaden-Fed Rats', A.G. Leitch, T.H. Lee, E.W. Ringel, J.D. Prickett, D.R. Robinson, S.G. Pyne, E.J. Corey, J.M. Drazen, K.F. Austen and R.A. Lewis, *J. Immunology*, **1984**, 132, 2559-2565.
14. 'Asymmetric Conjugate Addition of Organometallic Reagents to Chiral Vinyl Sulfoximines', S.G. Pyne, *J. Org. Chem.*, **1986**, 51, 81-87.
15. 'The Effect of Cations on the Asymmetric Conjugate Addition of Organocopper Reagents to Chiral Vinyl Sulfoximines', S.G. Pyne, *Tetrahedron Letters*, **1986**, 27, 1691-1694.
16. 'Asymmetric Intramolecular Conjugate Addition of Amines to Chiral Vinyl Sulfoximines. Total Synthesis of (R)-(+)- and (S)-(-) Carnegine', S.G. Pyne, *J. Chem. Soc., Chem. Commun.*, **1986**, 1686-1687
17. 'Asymmetric Intramolecular Conjugate Addition of Amines to Chiral Vinyl Sulfoxides Total Synthesis of (R)-(+)-Carnegine', S.G. Pyne, S.L. Chapman, *J. Chem. Soc., Chem. Commun.*, **1986**, 1688-1689.
18. 'Intramolecular Addition of Amines to Chiral Vinyl Sulfoxides, Total Synthesis of (R)-(+)-Canadine', S.G. Pyne, *Tetrahedron Letters*, **1987**, 28, 4737-4741.
19. 'Conjugate Addition of Amines to (E) and (Z) Chiral Vinyl Sulfoxides. An Enantioconvergent and Kinetic Process', S.G. Pyne, R. Griffith and M. Edwards, *Tetrahedron Letters*, **1988**, 29, 2089-2093.
20. 'The Autoxidation of 3-Hydroxyanthranilic Acid', M.K. Manthey, S.G. Pyne and R.J.W. Truscott, *J. Org. Chem.*, **1988**, 53, 1485-1488
21. 'Addition of Aliphatic and Aromatic Amines to Catechol Under Oxidising Conditions', M.K. Manthey, S.G. Pyne and R.J.W. Truscott, *Aust. J. Chem.*, **1989**, 42, 365-373
22. 'The Autoxidation of 3-Hydroxyanthranilic Acid in the Presence of Amino Acids', M.K. Manthey, S.G. Pyne and R.J.W. Truscott. *Tetrahedron*, **1989**, 45, 2803-2810.

23. 'Stereoselective Reactions of Lithium and Zinc tert-Butyl phenylmethylsulfoxide with Carbonyl Compounds and Imines', S.G. Pyne and G. Boche, *J. Org. Chem.*, **1989**, *54*, 2663-2667.
24. 'Diastereoselective Kinetically and Thermodynamically Controlled Additions of (R)(+) Methyl p-Tolyl Sulfoxide Anion to Imines', S.G. Pyne and B. Dikic, *J. Chem. Soc., Chem Commun.* **1989**, 826-827.
25. 'Conjugate Addition of Amines to (R<sub>s</sub>)-10-Isobornyl Vinyl Sulfoxides', S.G. Pyne, P. Bloem and R. Griffith, *Tetrahedron* **1989**, *45*, 7013-7022.
26. 'Stereochemistry of the Intermolecular and Intramolecular Conjugate. Addition of Amines and Anions to Chiral (E) and (Z) Vinyl Sulfoxides. Total Synthesis of (R)-(+)-Carnegine and (+) and (-)-Sedamine', S.G. Pyne, P. Bloem, S.L. Chapman, C.E. Dixon, and R. Griffith, *J. Org. Chem.* **1990**, *55*, 1086-1983.
27. 'Diastereoselective Addition of (R)-(+)-Methyl p-Tolyl Sulfoxide to Imines. Asymmetric Synthesis of (R)-(+)-Tetrahydropalmatine', S.G. Pyne and B. Dikic, *J. Org. Chem.* **1990**, *55*, 1932-1936.
28. 'Model Studies for Insect Protein Sclerotization: Oxidative Loss of the Side Chain from 4-Substituted Catechols', S.G. Pyne, R.J.W. Truscott, K. Maxwell, M.C. Morales, B.C. Walsh and B.L. Wynn, *Tetrahedron*, **1990**, *46*, 661-670.
29. 'Mechanism of Reaction of 3-Hydroxyanthranilic Acid with Molecular Oxygen.' M.K. Manthey, S.G. Pyne and R. J.W. Truscott, *Biochim. Biophys. Acta*, **1990**, *1034*, 207-212.
30. 'tert-Butyldimethylsilylchloride Mediated Pummerer Reactions of 10(R<sub>s</sub>)-Alkyl Isoborneol Sulfoxides', S.G. Pyne and B. Dikic, *J. Chem. Res(S)*, **1990**, 226-227.
31. 'Structure Elucidation and Independent Synthesis of the Radical-Racidal Coupling Products of 3-Hydroxyanthranilic acid with Tyrosine and Phenols', M.K. Manthey, S.G. Pyne and R.J.W. Truscott, *J.Org. Chem.*, **1990**, *55*, 4581-4585.
32. 'An Efficient and Diastereoselective Method for the Synthesis of (R)-1-Ferrocenylethylamines and 1-Ferrocenylethyl Acetate', D.M. David, L.A.P. Kane-Maguire and S.G. Pyne, *J. Chem. Soc, Chem. Commun*, **1990**, 888-889.
33. 'Asymmetric Synthesis of Chiral Amines via Nucleophilic Addition Upon Ferrocenylalkyl Substituted Imines', D.M. David, L.A.P. Kane-Maguire and S.G. Pyne, *J. Organomet. Chem.* **1990**, *390*, C6-C9.
34. 'Diastereoselective Additions of Lithiated N-tert-Butyldiphenylsilyl-S-Benzyl-S-Methylsulfoximine to Imines', S.G.Pyne, B. Dikic, B.W. Skelton and A.H. White, *J.Chem.Soc., Chem. Commun.*, **1990**, 1376-1378
35. 'Diastereoselective Additions of Lithiated N-tert-Butyldiphenylsilyl-S-Methyl-S-Phenylsulfoximine to Imines and Aldehydes', S.G. Pyne, and B. Dikic, *Tetrahedron Lett.*, **1990**, *31*, 5231-5234

36. 'Diastereoselective Nucleophilic Additions to Imines Attached to Arene Tricarbonylchromium Moieties', P. Bloem, D.M. David, L.A.P. Kane-Maguire, S.G. Pyne, B.W. Skelton and A.H. White, *J. Organomet. Chem.*, **1991**, 407, C19-C22.
37. 'Synthesis of Enantiomerically Pure Compounds', S.G. Pyne, *Chemistry in Australia*, **1991**, 212-214.
38. 'Reactive Metabolite Hypothesis for Human Senile Cataract', R.J.W. Truscott, S.G. Pyne, M. Manthey, *Lens and Eye Toxicity Research*, **1991**, 8, 251-257.
39. 'Highly Exo Diastereoselective Diels-Alder Reactions of (2S)-N-Benzoyl-2-tert-Butyl-4-Methylene-1,3-Oxazolidin-5-one', S.G. Pyne, B. Dikic, P. Gordon, B.W. Skelton and A.H. White, *J. Chem. Soc., Chem. Commun.*, **1991**, 1505-1506.
40. 'Involvement of Tyrosine Residues in the Tanning of Proteins by 3-Hydroxanthranilic acid', M.K. Manthey, S.G. Pyne and R.J.W. Truscott, *Proc. Nat. Acad. Sci. (USA)*, **1992**, 89, 1954-1957.
41. 'Production and Characterization of Antibodies of Platelet-Activating Factor', J.L. Macpherson, B. Spur, S.G. Pyne, F. Heymans, M.F. Cox, J.-J. Godfroid and S.A. Krilis, *Journal of Lipid Mediators*, **1992**, 5, 49-59.
42. 'Characterization of the Oxidation Products of Cinnabaric Acid', M.K. Manthey, S.G. Pyne and R.J.W. Truscott, *J. Heterocyclic Chem.* **1992**, 29, 263-264.
43. 'Diastereoselective Reactions of Sulfoximines', S.G. Pyne, *Sulfur Reports* **1992**, 12, 57-94.
44. 'Diastereoselective Additions of Lithiated *N*-tert-Butyldiphenylsilyl-S-Benzyl-S-Methylsulfoximine to Imines and Aldehydes', S.G. Pyne, B. Dikic, B.W. Skelton and A.H. White, *Aust. J. Chem.*, **1992**, 45, 807-822.
45. 'Synthesis of Epoxidated Chalcone Derivatives', C.E. Dixon and S.G. Pyne, *J. Chem. Educ.* **1992**, 1032-1033.
46. 'A Rapid and Efficient Synthesis of Oxaziridines and Diaryl Nitones using Oxone', A.R. Hajipour and S.G. Pyne, *J. Chem. Res. (S)* **1992**, 388.
47. 'Chiral Sulfur Compounds. XVIII. Structure and Conformation of (E) (S\*) Methyl 3-Phenyl-2-(phenylsulfinyl)propenoate', K. Hellmund, S.G. Pyne, *Aust. J. Chem.* **1992**, 45, 1923.
48. 'Stereochemistry of the Addition of Lithiated Methyl phenylsulfoxide to Nitrones', S.G. Pyne and A.R. Hajipour, *Tetrahedron*, **1992**, 48, 9385-9390.
49. 'Structure and Conformation of Vinyl Sulfoximines', Z. Dong, S.G. Pyne, B.W. Skelton and A.H. White, *Aust. J. Chem.*, **1993**, 46, 143-147.

50. 'Asymmetric Synthesis of Chiral Amino Acids via Diels-Alder Reactions of (2S)- and (2R)-4-Methylene-1,3-Oxazolidin-5-ones', S.G. Pyne, B. Dikic, P. Gordon, B.W. Skelton and A.H. White, *Aust. J. Chem.*, **1993**, *46*, 73-93.
51. 'Electropolymerization of 4-(3-pyrrol)-4-oxobutyric acid by in situ potentiodynamic pre-reduction/oxidation', C.O. Too, S.A. Ashraf, H. Ge, K.J. Gilmore, S.G. Pyne and G.G. Wallace, *Polymer* **1993**, *34*, 2684-2686.
52. 'Addition of Azide Ion to  $\beta$ -Aryl  $\alpha$ -Phenylsulfinylacrylates', Z. Dong, K.A. Hellmund, S.G. Pyne, *Aust. J. Chem.* **1993**, *46*, 1431-1436.
53. 'An Efficient Synthesis of (2S)- and (2R)-N-Benzoyl-2-tert-butyl-4-methyleneoxazolidin-5-one', A L.J. Beckwith, S.G. Pyne, B. Dikic, P. Gordon, B. Skelton, A.H. White, *Aust. J. Chem.* **1993**, *46*, 1425-1430.
54. 'Synthesis and Conjugate and 1,2 Addition Reactions of a Sterically Hindered Allylic Sulfoximine', S.G. Pyne and G. Boche, *Tetrahedron*, **1993**, *49*, 8449-8464.
55. 'Diastereoselective Nucleophilic Additions to Imines Attached to Tricarbonyl(arene) Chromium Moieties', D.M. David, L.A.P. Kane-Maguire, S.G. Pyne, *J. Chem. Soc. Dalton*, **1994**, 289-295.
56. 'Exo Diastereoselective Diels-Alder Reactions of (R) 2-Phenyl-4-Methylene-Oxazolidin-5-one' S.G. Pyne, J. Safaei-G., D.C.R. Hockless, B.W. Skelton, A.N. Sobolev and A.H. White, *Tetrahedron*, **1994**, *50*, 941-956.
57. 'A Convenient Synthesis of 2-Methoxy-1-Naphthyl Sulfoxides in High Enantiomeric Purity. A New Asymmetric Synthesis of 1-Benzyl-1,2,3,4-tetrahydroisoquinolines', S.G. Pyne, A.R. Hajipour, K. Prabakaran, *Tetrahedron Lett.*, **1994**, *35*, 645-648.
58. 'Diastereoselective Conjugate Addition Reactions of a Lithiated Allylic Sulfoximine to Acyclic Enones', S.G. Pyne, Z. Dong, B.W. Skelton and A.H. White, *J. Chem. Soc., Chem Commun.*, **1994**, 751-752.
59. 'Synthesis of 4,4'-Biimidazoles', M.D. Cliff and S.G. Pyne, *Synthesis*, **1994**, 681-682.
60. 'Chiral Sulfur Compounds. Part 25. Diastereoselective 1,2-Additions of Lithiated (+)-(S)-N-t-Butyldiphenylsilyl-S-Methyl-S-Phenylsulfoximine to Ketones.' S.G. Pyne, Z. Dong, B.W. Skelton and A.H. White, *J. Chem Soc, Perkin Trans. 1*, **1994**, 2607-2613.
61. 'An Unexpected Rearrangement of a  $\beta$ -Amino Sulfoxide under Pummerer Reaction Conditions' S.G. Pyne and A.R. Hajipour, *Tetrahedron*, **1994**, *50*, 13501-13510.
62. 'Diastereoselective Reactions of Allylic Sulfoximine Anions', S.G. Pyne and Z. Dong, *Phosphorus, Sulfur, and Silicon*, **1994**, *95*, 425-426.
63. 'Direct Synthesis of Trimethylvinylstanes from Aldehydes' M.D. Cliff and S.G. Pyne, *Tetrahedron Lett.*, **1995**, *36*, 763-766.

64. 'Exo-Diastereoselective 1,3-Dipolar Cycloadditions of Azomethine Ylides to (2R)-2-Phenyl-4-Methylene-Oxazolidin-5-one' S.G. Pyne, J. Safaei-G and F. Koller, *Tetrahedron Lett.*, **1995**, 36, 2511-2514.
65. 'Diastereoselective Reductions of  $\beta$ -Substituted- $\gamma$ -Keto-Sulfoximines and a Novel Palladium (0) Catalytic Allylic Sulfoximine to Allylic Sulfinamide Rearrangement' S.G. Pyne, Z. Dong, B.W. Skelton and A.H. White, *J. Chem Soc, Chem. Commun.* **1995**, 445-446.
66. 'Asymmetric Synthesis of 2-Acetyl-4(5)-(1R,2S,4R-trihydroxybutyl)imidazole', M.D. Cliff and S.G. Pyne, *J. Org. Chem.* **1995**, 60, 2378-2383.
67. 'Palladium(0) Catalysed Allylic Sulfoximine to Allylic Sulfinamide Rearrangement' S.G. Pyne, Z. Dong, *Tetrahedron Lett.* **1995**, 36, 3029-3030.
68. 'Asymmetric Synthesis of Proline Derivatives from (2R) and (2S)-2-tert-Butyl-3-benzoyl-4-methyleneoxazolidin-5-one' S. G. Pyne, A. Javidan, B.W. Skelton and A.H. White, *Tetrahedron*, **1995**, 51, 5157-5168.
69. 'Asymmetric Synthesis of (1,2,3)-2-Acetyl-4(5)-(1,2,3,4-tetrahydroxybutyl)imidazoles', M.D. Cliff, S.G. Pyne, *Tetrahedron Lett.* **1995**, 36, 5969-5972.
70. '1,3-Dipolar Cycloadditions of a Chiral Oxazolidinone with Nitrones and Nitrile Oxides', S.G. Pyne, J. Safaei-G., B.W. Skelton and A.H. White. *Aust. J. Chem.* **1995**, 48, 1511-1533.
71. 'Relative Stereochemistry of the Adducts from Addition of Lithiated Methyl Phenyl Sulfoxide to Oxaziridines' A.R. Hajipour and S.G. Pyne, *J. Chem Res.* **1995**, 360-361.
72. 'The 1,3-Dipolar Cycloaddition Reactions of C, N-Diphenyl Nitroene with Vinyl Sulfoximines', D.M. David, M. Bakavoli, S.G. Pyne, B.W. Skelton and A.H. White, *Tetrahedron*, **1995**, 51, 12393-12402.
73. 'Synthesis of (+)-(2S)-2-Aminobicyclo[2.2.2]octane-2-carboxylic Acid', S.G. Pyne and J. Safaei-G., *J. Chem. Res.*, **1996**, 160-161.
74. 'Synthesis, Characterisation and Reactions of the Chiral Transfer Agent 4R-Dicarbonyl-(triphenylphosphine)(4-Phenyl-(1R)-(1-phenylethyl)-1-aza-1,3-butadiene)iron(0)', L.A.P. Kane-Maguire, S.G. Pyne, A.F.H. Siu, B.W. Skelton and A.H. White, *Aust. J. Chem.* **1996**, 49, 673-676.
75. 'Palladium Catalysed Rearrangement of Allylic Sulfoximines: Synthesis of  $\gamma$ -Amino  $\alpha,\beta$ -Unsaturated Ketones and Esters', D.M. David, G.W. O'Meara and S.G. Pyne, *Tetrahedron Letters*. **1996**, 37, 5417-5420.
76. 'Palladium Catalysed Rearrangement of Allylic Sulfoximines: Application to the Asymmetric Synthesis of Chiral Allylic Amines' S.G. Pyne and Z. Dong, *J. Org. Chem.* **1996**, 61, 5517-5522.

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### Publications in Books

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2. 'Formation of C-C Bonds by Addition to Olefinic Double Bonds; Enamines, Nitroalkenes, 4,5-Dihydrooxazoles,  $\alpha,\beta$ -Unsaturated Sulfones, Sulfoxides and Sulfoximines, S.G. Pyne in '*Stereoselective Synthesis, Houben-Weyl Methods for Organic Chemistry*', Vol. E 21b, **1995**, Chapter 1.5.3. pp 2157-2202.
3. 'Formation of C-C Bonds by Addition to Olefinic Double Bonds; Addition of Metallated Allylic Phosphine Oxides, Phosphonates, Sulfones, Sulfoxides and Sulfoximines to  $\alpha,\beta$ -unsaturated Carbonyl Compounds', S.G. Pyne in

'*Stereoselective Synthesis, Houben-Weyl Methods for Organic Chemistry*', Thieme Stuttgart, G. Helmchen, R. W. Hoffmann, J. Mulzer, E. Schaumann Eds., Vol. E 21b, **1995**, Chapter 1.5.2.2. pp 2068-2086.

4. 'Chiral Sulfoximines for Diastereoselective and Asymmetric Synthesis', S.G. Pyne in '*Advances in Sulfur Chemistry*', JAI Press Inc. (ISBN:0-7623-0618-1) **2000**, Vol 2, pages 283-366.
5. 'The Development of a Novel Immunosuppressive Agent Isolated from Caramel Colour III', S.G. Pyne in *Natural Product Chemistry at the Turn of the Century*, A-ur-Rahman, M.I. Choudhary, K.M. Khan Eds., **2002**, pp. 265-269.
6. 'Synthesis and NMR Characterisation of Mono- and Bis-methano[60]fulleryl Amino Acid Derivatives and Their Reductive Ring-Opening Retro-Bingel Reactions.' P.A Keller, G.A Burley, G.E. Ball, S.G. Pyne; *Proceedings - Electrochemical Society* **2002**, 2002-12 (Fullerenes-Volume 12: The Exciting World of Nanocages and Nanotubes), 298-306.
7. 'Electrocoagulation in Aqueous Alcoholic Solutions', K. Jumpathong, W. Phutdhawong, S. Chowwanapoonpohn, M. J. Garson, S. G. Pyne and D. Buddhasukh, in '*Trends in Electrochemistry Research*' Editors, Nunez, Magdalena, Nova Science Publishers, New York, **2007**, Chapter 5, pp. 143-160. [ISBN: 1-59454-457-3]

## Patents

1. S.A. Ashraf, L.A.P. Kane-Maguire, S.G. Pyne, G.G. Wallace, *Provisional Aust. Patent* no. P-3414 YS/JP **1995**.
2. Pyne, Stephen Geoffrey; Ung, Alison Thavary. **Preparation of acetyl thiazole analogs for treating disorders.** PCT Int. Appl. (1997), 49 pp. CODEN: PIXXD2 WO 9746543 A1 19971211 CAN 128:75391 AN 1998:1465
3. J.B. Bremner, J.A. Coates, D.R. Coghlan, D.M. David, P.A. Keller, S.G. Pyne and H.M. Witchard, "Peptoid Compounds", *Provisional Aust. Patent* no. PR6044/01 filed 29 June **2001**.
4. J.B. Bremner, S.G. Pyne, P.A. Keller, D. Coghlan, A. Garas, H. Witchard, T. Boyle, J.A. Coates; Preparation of Peptoid Compounds for Treatment of Bacterial Infections. PCT Int. Appl. **2003**, 102 pp. CODEN: PIXXD2 WO 0302545 A1 20030109 CAN 138:90077 AN 2003:22860.
5. Boyle, Timothy Patrick; Bremner, John Barnard; Brkic, Zinka; Coates, Jonathan Alan Victor; Dalton, Neal Kevin; Deadman, John; Keller, Paul Anthony; Morgan, Jody; Pyne, Stephen Geoffrey; Rhodes, David Ian; Robertson, Mark James. **Preparation of biaryl-based peptides for the treatment of infection.** PCT Int. Appl. (2006), 242 pp. CODEN: PIXXD2 WO 2006074501 A1 20060720 CAN 145:167557 AN 2006:699962
6. United States provisional patent application, "Substituted Phenanthrene Analogs"), application number (60/910324), application date (5 April 2007).

## INVITED LECTURES

1. 'Asymmetric Synthesis of Chiral Amines and Alkaloids Using Chiral Sulfur Reagents'. S.G. Pyne, **Invited Lecturer**, R.W. Johnson Pharmaceutical Research Inst., Springhouse, USA, April, 1990.
2. 'Asymmetric Synthesis of Non Proteinogenic Amino Acids from (-)-N-Benzoyl-2-t-Butyl-4-Methylene-1,3-Oxazolidin-5-one', S. G. Pyne, **Invited Lecturer**, Abstracts of the Southern Highlands Conference of Heterocyclic Chemistry, Bowral, NSW, September 1991.
3. 'Asymmetric Synthesis of Amino Acids via Exo-Selective Diels-Alder reactions.' S. G. Pyne, **Invited Plenary Lecturer**: Silver Jubilee of Chemistry of the Malaysian Chemical Institute, Kuala Lumpur, 17th-19th November 1992.
4. 'Asymmetric Synthesis via Novel Chiral Sulfur Reagents and Oxazolidines'. S. G. Pyne, **Rhone-Poulenc Award Lecture**, Medicinal Chemistry Department, Rhone Poulenc, Vitry-Alfortville, Paris, France Feb 1994.
5. 'Diastereoselective 1,4-Additions and 1,4-Asymmetric Induction via Chiral Sulfoximines', S. G. Pyne and Z. Dong, **Invited short presentation-22**, pg 7.
6. in the book of Abstracts, 10th IUPAC International Conference on Organic Synthesis, Bangalore, India, December 1994.
7. 'Stereoselective Synthesis of THI and Analogues', S. G. Pyne, **Invited speaker**, Gordon Conference on Chemical Reactions and Processes, New Hampton, New Hampshire, July 1995.
8. 'Diastereoselective Reactions and Rearrangements of Chiral Allylic Sulfoximines', S.G. Pyne, D.D. David, Z. Dong, G. O'Meara, **Invited lecture** IL-8, pg 20 in the book of Abstracts of the 17th International Symposium on the Organic Chemistry of Sulfur, Tsukuba, Japan, July, 1996.
9. 'Heterocycles, Immunosuppression and Coca-Cola', S.G. Pyne, **Invited Lecturer**, Abstracts of the Southern Highlands Conference of Heterocyclic Chemistry, Bowral, NSW, 6-8 September 1998.
10. 'The Development of a Novel Immunosuppressive Agent Isolated from Caramel Colour III', S.G. Pyne, A.T. Ung and G. Jeffreys, **Invited Symposium Lecturer**, pg 40, in the Proceedings of the 9th Asian Symposium on Medicinal Plants, Spices and Other Natural Products, Hanoi, Vietnam, 24-28 September 1998.
11. 'The Development of a Novel Immunosuppressive Agent Isolated from Caramel Colour III', S.G. Pyne, A.T. Ung and G. Jeffreys, **Invited Lecturer**, in the Proceedings of the 4<sup>th</sup> Brisbane Biological Chemistry Symposium, 9<sup>th</sup> July, 1999.
12. 'The Development of a Novel Immunosuppressive Agent Isolated from Caramel Colour III', S.G. Pyne, **Invited Plenary Lecturer**: 8<sup>th</sup> International Symposium on Natural Products Chemistry, Karachi, Pakistan, January 18-22, 2000.

13. '1,4-Asymmetric Induction of Chirality Using Palladium(0) Catalysed Chemistry,' S.G. Pyne, **Invited Keynote Speaker**: 11<sup>th</sup> Royal Australian Chemical Institute Convention, Canberra, 6-11<sup>th</sup> February 2000. Book of Abstracts pg 22.
14. 'Progress towards the synthesis of natural products using metal catalysed reactions,' S.G. Pyne, Z. Dong and K. Lindsay, **Invited Lecturer**, 10<sup>th</sup> Asian Symposium on Medicinal Plants, Spices and other Natural Products, 18-23 November 2000, Dhaka, Bangladesh, Book of Abstracts pg 49.
15. 'Progress towards the synthesis of heterocyclic natural products using metal catalysed reactions,' S.G. Pyne, **Invited Plenary Lecturer**: Heterocyclic Chemistry Symposium, Pacificchem 2000, Hawaii, 14-19<sup>th</sup> December 2000
16. 'Asymmetric Synthesis of (+)-Swainsonine and (+)-8, 8a-di-epi-Swainsoine', S.G. Pyne and K. Lindsay, **Invited Lecturer**, The 1<sup>st</sup> Japan Australia Symposium on Organic Chemistry, Monash University, Melbourne, December 10-11 2001, Book of abstracts pp 28.
17. 'Phytochemical and Synthetic studies on Stemona Alkaloids, S.G. Pyne *et al.* **Invited Lecture** (PC-IL-04), 11<sup>th</sup> Asian Symposium on Medicinal Plants, Spices and other Natural Products, 26-30 October 2003, Kunming, China, Book of Abstracts pg 116.
18. 'Diastereoselective Synthesis of Polyfunctionalized Pyrrolidines', S.G. Pyne, **Invited Lecture** (IL-38), 20<sup>th</sup> Royal Australian Chemical Institute Organic Chemistry Conference, Cairns, Australia 4-8 July 2004, Book of Abstracts pg IL-RACIOC-38.
19. 'Phytochemical Studies on Stemona Alkaloids'', S.G. Pyne *et al.* **Invited Lecture**, 3<sup>rd</sup> International Conference on Natural Products, 23-25 October 2004, Nanjing, China, Book of Abstracts pg 44.
20. **Invited Plenary Lecturer** to the 10<sup>th</sup> International Symposium on Natural Product Chemistry (Pakistan) in 2006 (offer declined due to political instability).
21. **Invited Plenary Lecturer** to the Gordon Research Conference on Natural Products in the USA in July 2006.

Prof. Pyne's research has made significant contributions to Research in Organic Chemistry in Australia and Internationally in the following research areas:

**1. Chiral Sulfur Chemistry and Asymmetric the Synthesis of Alkaloids (1985-2002)**

He has developed novel synthetic methodology for the asymmetric synthesis of several bioactive alkaloids ((+) and (-)-sedamine, (+)-carnegine and (+)-canadine) and chiral allylic amines, amino acids and cyclopropanes using chiral sulfoxides and sulfoximines under anionic conditions or under the influence of Pd(0) catalysts. He has done pioneering research on the mechanisms and the stereochemical outcomes of these reactions. Much of this work has been heavily cited in the chemical literature. For example, his *J. Org. Chem.* 1989, and his 2 *J. Org. Chem.* 1990 articles have been cited, 46, 59 and 59 times, respectively (ISI 22/3/2005), while his relatively more recent chiral sulfur chemistry paper (*J. Org. Chem.* 1997) has been cited 29 times.

He has worked in collaboration with G. Boche (Marburg, Germany), and G. Solladie (Strasbourg, France) on fundamental structural, stereochemical, mechanistic and synthetic aspects of chiral sulfur chemistry. From this work he received the following prizes, Von Humboldt Fellowship, 1992; Young Researcher of the Year Award for 1992 (offered by the Australian Research Council & the von Humboldt Foundation), a Rhone Poulenc Fellowship in 1994 under the Bede Morris Fellowship Scheme and an ARC Senior Fellowship 1994-1998. In 1998 he received a DIST grant to work in collaboration with A. Pfaltz (then at Mulheim, Germany) on palladium(0) catalysed reactions of chiral sulfoximines.

He was an invited lecturer of the 17th International Symposium on the Organic Chemistry of Sulfur, in Tsukuba, Japan, in July, 1996 and was invited Keynote Speaker at the 11<sup>th</sup> Royal Australian Chemical Institute Convention, Canberra, 6-11<sup>th</sup> February 2000.

He was a Member of the Editorial Advisory Board of *Sulfur Letters* and of *Sulfur Reports* 1997-99 and then Managing Editor of these journals in 1999-2002. He has written chapters based upon his expertise in chiral sulfur chemistry for the following books, 'Studies In Natural Products Chemistry', 1992, 'Stereoselective Synthesis, Houben-Weyl Methods for Organic Chemistry', 1995 and 'Advances in Sulfur Chemistry', 2000.

## **2. *Asymmetric Synthesis of Bioactive Alkaloids (2000-2005)***

More recently he has developed novel and elegant methods for the asymmetric synthesis of bioactive polyhydroxylated indolizidine and pyrrolizidine alkaloids using the aminolysis of chiral vinyl epoxides and the ring-closing metathesis reaction. A significant innovation was the use of pyrrolo[1,2-*c*]oxazol-3-ones as substrates to diastereoselectively introduce the *syn*-1,2-diol functionality into his target alkaloids through diastereoselective *syn*-dihydroxylation reactions. These substrates provided products with opposite facial selectivities to that of the more traditional 2-substituted-2,5-dihydropyrrole substrates. This work has been very productive over the past 5 years and has resulted in two total syntheses of the alkaloid, swainsonine and the total syntheses of epi-australines and the synthesis of the putative structure of uniflorine A. More recently this research has focussed on the synthesis of the structurally challenging *Stemona* alkaloids. He has written an Invited Account on this work for the journal *Synlett* (2004). He was an Invited Lecturer at the 10<sup>th</sup> Asian Symposium on Medicinal Plants, Spices and other Natural Products, in 2000, Dhaka, Bangladesh, an Invited Plenary Lecturer at the Heterocyclic Chemistry Symposium, Pacificchem 2000, Hawaii, 2000, an Invited Lecturer, at the 1<sup>st</sup> Japan Australia Symposium on Organic Chemistry, Monash University, Melbourne, 2001 and an Invited Lecture at the 20<sup>th</sup> Royal Australian Chemical Institute Organic Chemistry Conference, Cairns, Australia in 2004. In addition he is an Invited Plenary Lecturer to the Gordon Conference on Natural Products Chemistry in 2006.

## **3. *Drug Design and Synthesis (1995-2005)***

He has been very successful in obtaining research funding from Johnson and Johnson Research Pty. Limited for drug design, synthesis and development. This collaboration has resulted in the building of a new laboratory in 2005 for drug discovery in the Department of Chemistry at the University of Wollongong. While much of this work is confidential and subject to patenting, a number of papers have been published from studies on novel chiral immunosuppressive agents and more recently on novel chiral glutamate analogues, that required the development of new synthetic and diastereoselective methods.

Through ongoing support from Avexa (initially AMRAD), and in collaboration with J. Bremner and P. Keller, he has developed new peptoid antibacterial agents that are potent on drug resistant strains. Two patents have arisen from this ongoing project.

Some of this work has been also supported by the ARC (Linkage grants) and by the NHMRC (Development Grant in 2004).

#### **4. Fullerene Chemistry (2000-2005)**

Fundamental work is being developed with P. Keller on the regioselective functionalization of the fullerene surface to make higher-order fullerenes. Novel amino acid derivatives, including fullerenyglycines have been realized. This innovative work on fullerenes is now supported by the new ARC Centre for Nanostructured Electromaterials at the University of Wollongong. The team has been invited to give lectures at the 201<sup>st</sup> (Philadelphia), 205<sup>th</sup> (San Antonio) and 207<sup>th</sup> (Quebec City) Electrochemical Society Meetings. In collaboration with Dr. G. Ball (UNSW), they are developing new NMR methods for the unequivocal structural analysis of highly functionalized fullerenes.

#### **5. Natural Products Chemistry (2003-2005)**

In a new collaboration with A. Prof. A. Jatisatienr at Chiang Mai University, Thailand he has an ongoing project concerned with the discovery of new alkaloids from the many different species of *Stemona* plants growing in Thailand. The extracts of these plants are important in traditional medicines. To date (2003-5) he has published 4 papers on the structure and biological activities of 5 new *Stemona* alkaloids. In 2003 he reported the structure of stemocurtisine, the first example of a *Stemona* alkaloid with a pyrido[1,2-*a*]azepine A,B-ring system (that is, a 6,7-bicyclic A,B-ring system), and not the more common pyrrolo[1,2-*a*]azepine (5,7-bicyclic A,B-ring system) nucleus. These discoveries disclosed a new and 6<sup>th</sup> structural class of *Stemona* alkaloids. He has been an Invited Lecturer at the 11<sup>th</sup> Asian Symposium on Medicinal Plants, Spices and other Natural Products, 2003, Kunming, China and the 3<sup>rd</sup> International Conference on Natural Products, 2004, Nanjing, China. In addition, he is an Invited Plenary Lecturer to the 10<sup>th</sup> International Symposium on Natural Product Chemistry (Pakistan) in 2006.

#### **6. Cycloaddition Chemistry and the Synthesis of Non-proteinogenic Amino Acids and Novel Spiro-Heterocycles**

He has developed (2*S*)-*N*-benzoyl-2-*tert*-butyl-4-methylene-1,3-oxazolidin-5-one and related exo-cyclic methylene compounds as substrates to prepare non-proteinogenic chiral amino acids through cycloaddition (Diels-Alder, 1,3-dipolar reactions and

phosphine-catalysed [3+2] cycloadditions) and free radical reactions. This chemistry has also been used to synthesise novel conformationally restricted glutamate analogues and novel spirocyclic heterocycles, including carbocyclic hydantocidins (papers submitted to *J. Org. Chem.* and *Tetrahedron*).