**Curriculum Vitae Form – Co-leader**

**1. General information:**

|  |  |
| --- | --- |
| First and last name | Frances Separovic |
| E-address | fs@unimelb.edu.au |
| Title | Professor |
| Organization | University of Melbourne |

**2. Education (reverse chronological order)**

Degree, university/department, field, time period

|  |
| --- |
| Ph.D., University of New South Wales, Physics, 1992B.A. (Hons), Macquarie University, Physics, 1986 B.A., Macquarie University, Macquarie University, Mathematics and Physics, 1984Biol. Tech. Cert., Sydney Technical College, Sydney Technical College, Biology, 1978  |

**3. Work experience (reverse chronological order)**

|  |
| --- |
| University of Melbourne, Faculty of Science, Chemistry, Bio21 Institute, Professor Appointed: 20052016 Visiting Professor, CBMN, CNRS-University of Bordeaux; Electronics & Computer Science, University of Southampton; Harvard Medical School, Boston2014, Jawaharlal Nehru University, School of Life Sciences, Visiting Professor2010-2017 Board, Centre for Chemistry and Biotechnology, Deakin University2010-2015 University of Melbourne, Faculty of Science, School of Chemistry, Head2001-2011, San Diego State University, College of Sciences, Chemistry & Biochemistry, Adjunct Professor2009-2010, University of Melbourne, Faculty of Science, Associate Dean (International) 2008-2009, Birkbeck College, School of Crystallography, Visiting Professor2006-2008, Deputy Head, University of Melbourne 2000-2007, Associate Senior Member, University of Oxford, St Hugh's College2000-2002, Assistant Dean (EO), University of Melbourne, Faculty of Science 1996-2005, Associate Professor and Reader, University of Melbourne, Faculty of Science, Chemistry 1994-1995, Fogarty Fellow, National Institute of Health (NIH), National Institute of Alcohol Abuse & Alcoholism, Laboratory of Membrane Biochemistry & Biophysics 1993-1995, Senior Research Scientist, Commonwealth Scientific and Industrial Research Organization (CSIRO), Food Science and Technology, Synthetic Membrane Materials 1984-1993, Experimental Scientist, Commonwealth Scientific and Industrial Research Organization (CSIRO), Food Processing, Membrane Technology 1979-1983, Technical Officer, Commonwealth Scientific and Industrial Research Organization (CSIRO), Food Research, Food Structure 1972-1978, Technical Assistant, Commonwealth Scientific and Industrial Research Organization (CSIRO), Food Research, Microbiology |

**4. Professional, research and academic experience and achievements**

a. Projects worked on as the leader and collaborator (incl. their financial values)

|  |
| --- |
| Projects are listed below in 4b. Following a career at CSIRO, I joined the University in 1996 and established a new research group. The total funding raised, comes to ~$8.4M placed in School accounts (from a total of $16.8M, not including outside equipment grants). |

b. Research grants awarded so far (incl. funds awarded)

|  |
| --- |
| NHMRC Project grant: Proline-rich host defense peptide analogues as new antibiotics against MDR bacteria, $610,788 from 2019 to 2021 Australian Research Council: for “Integrating quantum hyperpolarisation in nuclear magnetic resonance systems, $553,000 from 2019 to 2021 University of Melbourne - University of Manchester Research Fund: Antibiotic resistance - a quantitative biological physics approach, $10,000 for 2018 to 2019 NHMRC Project grant: Mechanism of bacterial resistance to antimicrobial peptides, $675,585 from 2018 to 2020 Australian Research Council: Atomic details of antimicrobial peptides at work in live cells, $377,600 from 2016 to 2018Australian Research Council: Dynamic Nuclear Polarisation system for molecular structure determination, $800,000 ($1.6M) for 2016Melbourne Research Dyason Fellowship: Structural and functional investigations of the antimicrobial peptide maculatin 1.1 via 19F NMR spectroscopy, $5,000 for 2015Australian Research Council: Structure and activity determination of membrane-active peptides, $330,000, from 2014 to 2016Australian Research Council: Biomembrane Interactions Facility, $280,000 ($560k), for 2014Melbourne Research Interdisciplinary Seed Funding: Correlating membrane binding and toxicity of amyloid beta peptide from Alzheimer’s disease, $30,000 for 2014NHMRC Project grant: Selective targeting of microbes by peptides of the innate immune system, $606,000, 2013 to 2015CSIRO PhD studentships: $179,262, from 2012 to 2016Melbourne-Vanderbilt Grant: Membrane structure and lipid interactions of the pore-forming toxin equinatoxin II, $49,950, 2012Australian Research Council: Advanced characterisation of materials by nuclear magnetic resonance, $600,000($1.285M), 2011 to 2012.Australian Research Council: The mechanism of membrane disruption by antimicrobial peptides, $310,000, 2011 to 2013Melbourne Research Interdisciplinary Seed Funding: $40,000 Membrane recognition of antimicrobial peptides, $40,000 for 2010Melbourne Research Grant Scheme: Amphibian peptides as new antibiotics -structural determinants of antimicrobial activity, $35,155 for 2009Australian Research Council: Membrane-associated Abeta peptide structure and the effect of metals, $360,000, from 2009 to 2011 Australian Academy of Science (AAS): Scientific Visits to Europe 2009-2010, $10,500, from 2009 to 2010 ANSTO-UM CRSS: The location of antimicrobial peptides in phospholipid membranes determined by neutron techniques, $29,502, from 2009 to 2009 Australia Research Council: Enhanced nuclear magnetic resonance research, characterisation and analysis facility, $600,000 ($1.48M), from 2008 to 2009 University of Melbourne: Structural determinants of activity of antimicrobial peptides, $10,000, from 2008 to 2009 Australian Research Council: Membrane Protein Structure and Interaction Facility, $1,047,000 ($2.2M), from 2006 to 2007 Australian Research Council: Structure and activity of host-defence peptides from Australian anurans: anticancer agents, neuropeptides and nNOS inhibitors, $362,000, from 2006 to 2008Australian Research Council: Development of reactive ionic liquids for future industrial applications in Australia, $712,610, from 2006 to 2008 Australian Research Council: Membrane interactions and neurotoxicity of amyloid Abeta peptides from Alzheimer's disease, $330,000, from 2006 to 2008 Australian Research Council: Small Molecule NMR Facility for Accelerated Drug Discovery, $907,511 total $2.4M, from 2004 to 2005 Australian Research Council: Membrane structure and lipid interactions of the pore-forming toxin Equinatoxin II by NMR, $285,000, from 2003 to 2005 Australian Research Council: Biologically active peptides and proteins from anurans: The relationship between structure and activity, $345,000, from 2003 to 2005 Melbourne International Collaborative Research Grants Scheme: Fluorescence and NMR studies of membrane peptides and proteins, $7,400, from 2003 to 2003 Melbourne Research Grant Scheme: Structure and membrane interactions of lytic peptides and pore-forming toxins, $27,000, from 2002 to 2003 Melbourne Research Development Grant Scheme: A solid-state NMR study of protein hydration and stability, $22,200, from 2001 to 2002 Australian Research Council RIEFG: Integrated Victorian NMR Spectroscopy Network, $675,000, from 2001 to 2002 Melbourne Research Development Grant Scheme: Inhibitor effect on transmembrane structure of nicotinic acetylcholine receptor, $23,000, from 2001 to 2002 Australian Research Council: Biologically active peptides from Anurans: The relationship between structure and activity, $87,000, from 2001 to 2002UniChe Scheme: Characterisation of wood resins by NMR spectroscopy, $20,000, from 2001 to 2002 Australian Research Council: Structural organization of spider silk: A comparative approach, $15,000, from 2000 to 2001University of Melbourne Collaborative Research Program: Study of the interaction of membrane active peptides by NMR and ATR spectroscopies, $6,000, from 2000 to 2001University of Melbourne Research Support Fund: 13C and 1H NMR spectral database, $15,240, from 2000 to 2001Australian Research Council: A solid-state NMR study of protein hydration and stability, $12,000, from 1999 to 2000Australian Research Council: Solid-state NMR Facility, $956,900, from 1999 to 2000Australian Research Council: NMR solution structure of a nicotinic acetylcholine receptor segment complexed with a synthetic inhibitor, $19,085, from 1998 to 1999Australian Research Council: 600 MHz NMR spectrometer for biochemical research, $1,200,000, from 1997 to 1998Australian Research Council: Structure of membrane peptides by solid-state NMR methods, $29,900, from 1997 to 1998Australian Research Council: The structure, dynamics and mechanisms of action of ionophoric peptides in lipid bilayers, $144,000, from 1996 to 1998CSIRO: NMR Spectrometer, $228,000, from 1992 to 1993 |

c. Mentorship experience

|  |
| --- |
| *Post-Graduate Students:*Ms Yuen-Han Lam (PhD, 1998-2001)Ms Aphrodite Anastasiadis (PhD, 1998-2002; Student Prize, 2001 Lorne Protein Conference)Ms Anita Kishore (MSc, 1999-2000)Mr Feda Ali (PhD 2000-03)Ms Anna Tickler (PhD 2000-03; Student Prize, 2002 Lorne Protein Conference)Mr Mohammad Balla (MSc, 2001-03)Ms Crystal Lau (PhD, 2002-06)Ms Alison Drechsler (PhD, 2003-2008)Mr Geoff Burrell (PhD, 2006-2010)Mr Scott Fraser (PhD, 2007-2011)Mr David Fernandez (PhD, 2008-2012)Mr Thomas Whitwell (MSc, 2011-2012)Mr Daniel Weber (PhD, 2011-2015)Ms Elahehsadat Jamasbi (PhD, 2012-2016)Ms Anna Mularski (PhD, 2013-2016)Ms Siobhan Carne (MSc, 2015-2016)Ms Miriam Kael (MSc, 2015-2017)Mr Shashikanth Bhargava Parcha (MPhil, 2016)Ms Catherine Nguyen (MSc, 2017-18)Ms Yufei Jiang (MSc, 2017-)Mr Shiying Zhu (PhD, 2017-)*Primary with Co-supervisor*:Mr Andrew Thompson (PhD 2000-01)Mr Fazel Shabanpoor (PhD 2006-2010; Student Prize, 2009 ASB Conference))Ms Linda Chan (PhD, 2009-2013; Monica Reum Memorial Prize)Ms Vinojini Nair (PhD, 2011-2014)Ms Emmy Wijaya (PhD, 2012-2016)Mr Thomas Meikle (PhD, 2012-2016)Ms Behnoosh Tajik (PhD, 2012-2018)Mr John Karas (PhD, 2012-2016)Mr Wenyi Li (PhD, 2013-2016; Monica Reum Memorial Prize)Mr Nitin Patil (PhD, 2013-2016)Mr Ramin Sharifi (MSc, 2015-2016)*Post-Doctoral Fellows:*Dr Craig Morton (1998-1999)Dr Maurits de Planque (2000-2001)Dr Andrew Dodd (2003-2004)Dr John Gehman (2004-2009)Dr Martin Boland (2005-2006)Dr Marc-Antoine Sani (2009-19)Dr Sarah Overall (2016-17)Dr Vinzenz Hofferek (2017-19) |

d. Cooperation with academia and business sector

|  |
| --- |
| Collaborate widely, primarily in the area of membrane biophysics and biological solid-state NMR, with joint grants and publications: e.g. Prof. G Anderluh, Slovenia (toxins), Prof. I Marcotte, Canada (in-cell NMR), Prof. MI Aguilar, Australia (antimicrobial peptides); see list at <http://separovic.chemistry.unimelb.edu.au/#tab37>  |

e. Entrepreneurial achievements, innovation activities, patents granted

|  |
| --- |
| Research Group Leader and IP Manager: Development of Ion Channel Switch Biosensor, Australia, 1995, AMBRI |

f. Research prizes awarded

|  |
| --- |
| *2018, Victorian Honour Roll of Women awardee**2017, Fellow of Royal Australian Chemical Institute**2017, UNSW Alumni Science & Technology Award**2017, IUPAC Distinguished Women of Chemistry/Chemical Engineering award**2016- Chemical Reviews, Editorial Advisory Board**2014-16 Australian Research Council College of Experts**2012, ISMAR Fellow, International Society for Magnetic Resonance**2012, Fellow of the Australian Academy of Science**2012, Fellow of the Biophysical Society, Biophysical Society (USA)**2012-2019, European Biophysics Journal, editor**2011-2013, President, Australian New Zealand Society for Magnetic Resonance**2011, ANZMAG Medal, Australian & New Zealand Society for Magnetic Resonance**2009, Robertson Award, Australian Society for Biophysics**2009-2017, Accounts of Chemical Research Editorial Board, ACS**2009-2017, ISMAR Nominations Committee, International Society for Magnetic Resonance* *2008-2010, Honorary General Treasurer, Royal Australian Chemical Institute* *2007-2009, Council, Biophysical Society (USA), 2009-11 Program Committee* *2006-2018, Biochimica et Biophysica Acta–Biomembranes, editor**2006-2007, Chair, Membrane Structure & Assembly Subgroup, Biophysical Society (USA)**2006-2008, Steering Committee, Asian Biophysics Association**2002-2005, Council, IUPAB, International Union Pure and Applied Biophysics**1999-2000, President, Australian Society for Biophysics**1999-2002, Biophysics Committee, Australian Academy of Science**1998-2001, International Committee, Biophysical Society (USA)* *1996-2009, Concepts in Magnetic Resonance Editorial Board, Wiley* *1995-2000, Director, Australian New Zealand Society for Magnetic Resonance**1994-1995, Fogarty Fellowship, National Institutes of Health (USA)* *1988, Japanese Government Research Award for Foreign Specialists, Natl Chem Lab. for Industry*  |

g. Other evidence on impact and contribution to the field

|  |
| --- |
| Currently I am Secretary of the Biophysical Society (USA), a member of Council of the International Union of Pure & Applied Biophysics, and Titular Member of Division I (Physical & Biophysical Chemistry) of the International Union of Pure & Applied Chemistry. I have over 250 refereed publications (with 8850 citations & h-index 53, Google Scholar), 75 invited conference talks, and given 190 seminars at research institutions. |

**5. Most relevant publications within the last 5 years and the career-best publication**

|  |
| --- |
| 1. “Combating bacterial resistance by combination of antibiotics with antimicrobial peptides.” Sheard, D.E., O’Brien-Simpson, N.M., Wade, J.D. and Separovic, F. (2019) *Pure Appl. Chem.* 99, 199-209.
2. “Antimicrobial peptide structure: From model membranes to live cells.” Sani, M.-A. and Separovic, F. (2018) *Chem. Eur. J*. **24**, 286-291.
3. “The efficient synthesis and purification of amyloid-β(1-42) using an oligoethylene glycol-containing photocleavable lysine tag.” Karas, J.A., Noor, A., Schieber, C., Connell, T.U., Separovic, F. and Donnelly, P.S. (2017) *Chem. Commmun.* **53**, 6903-6905.
4. “Predicting the release profile of small molecules from within the ordered nanostructured lipidic bicontinuous cubic phase using translational diffusion coefficients determined by PFG-NMR.” Meikle, T.G., Yao, S., Zabara, A., Conn, C.E., Drummond, C.J. and Separovic, F. (2017) *Nanoscale* **9**, 2471-2478.
5. “Total chemical synthesis of an intra-A-chain cystathionine human insulin analogue with enhanced thermal stability.” Karas, J.A.,Patil, N.A., Tailhades,J. Sani, M.-A., Scanlon, D.B., Forbes, B.E., Gardiner, J.,Separovic,F., Wade J.D., and Hossain, M.A. (2016) *Angew. Chem. Int. Ed.* **55**, 14743-14747.
6. “How membrane-active peptides get into lipid membranes.” Sani, M.-A. and Separovic, F. (2016) *Acc. Chem. Res.* **49**, 1130-1138.
7. “Bacteria may cope differently from similar membrane damage caused by the Australian tree frog antimicrobial peptide maculatin 1.1.” Sani, M.-A., Henriques, S.T., Weber D. and Separovic,F. (2015) *J. Biol. Chem.* **290**, 19853-19862.
8. “Proline-15 creates an amphipathic wedge in maculatin 1.1 peptides that drives lipid membrane disruption.” Sani, M.-A., Lee, T.-H., Aguilar, M.-I. and Separovic, F. (2015) *Biochim. Biophys. Acta* **1848**, 2277-2289.
9. “Characterization of lipid-binding site of equinatoxin II by NMR and molecular dynamics simulation.” Weber, D.K., Yao, S., Rojko, N., Anderluh, G., Lybrand, T.P., Downton, M.T., Wagner, J. and Separovic, F. (2015) *Biophys. J.* **108**, 1987-1996.
10. “Proline-rich antimicrobial peptides: multiple potential therapeutics against antibiotic resistant bacteria.” Li, W., Tailhades, J., O’Brien-Simpson, N.M., Hossain, M.A., Separovic, F., Otvos, L. Jr and Wade, J.D. (2014) *Amino Acids* **46**, 2287-2294.

Career best: “Amyloid- peptide disruption of lipid membranes and the effect of metal ions.” Lau, T.-L., Ambroggio, E.E., Tew, D.J., Cappai, R., Masters, C.L., Fidelio, G.D., Barnham, K.J. and Separovic, F. (2006) *J. Mol. Biol.* **356**, 759-770. |
|  |

**Signature:**

|  |
| --- |
|  |