

# *CURRICULUM VITAE*

*TOBY WILLIAM ALLEN, Ph.D.*

## *OFFICE ADDRESS*

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**Address:** Department of Physiology & Biophysics  
Weill Medical College of Cornell University  
Room W-201, 1300 York Avenue, New York, NY 10021

**Phone:** 212-746-4237

**Fax:** 212-746-4843

**E-mail:** Toby.Allen@cornell.edu

## *POSTDOCTORAL TRAINING*

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### **October 2001 – Present**

Cornell University (Weill Medical College), Department of Physiology & Biophysics. *New York, New York, U.S.A.*

**Postdoctoral Fellowship** with Prof. Olaf Andersen (Physiology & Biophysics) and Prof. Benoit Roux (Biochemistry). Research into biological ion channel and biomembrane function.

### **June 1997 – September 2001**

Australian National University, Department of Physics. *Canberra, Australian Capital Territory*

**Postdoctoral Fellowship** with Dr. Shin-Ho Chung in the theoretical modeling of ion transport through biological ion channels.

## *EDUCATION*

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### **June 1994 – June 1997**

Australian National University, Department of Theoretical Physics. *Canberra, Australian Capital Territory*

**Degree of Doctor of Philosophy (Theoretical Physics)** in Quantum Field Theory under the supervision of Dr. C. J. Burden. Thesis title: "Positronium Mass Spectrum in Quantum Electrodynamics in 2+1 dimensions."

### **1991 – 1993**

Curtin University of Technology, Department of Applied Physics. *Perth, Western Australia*

**Bachelor of Science (Physics) with First Class Honours:** Honours thesis in quantum physics, ab initio and density functional theory calculations.

### **1989 – 1990**

Curtin University of Technology, Department of Chemical Engineering. *Perth, Western Australia*

**Bachelor of Engineering** (Chemical Engineering). Two years completed.

## SHORT-TERM APPOINTMENTS

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November 1993 – May 1994

University of Western Australia, Department of Chemistry. *Perth, Western Australia*

**Research assistant.** Ab initio calculations with Profs. G. Chandler and B. Figgis.

December 1992 – March 1993

University of Adelaide, Department of Theoretical and Mathematical Physics. *Adelaide, South Australia*

**Research studentship.** Quantum field theory project with Prof. A. Thomas.

December 1991 – March 1992

Curtin University of Technology, Department of Applied Physics. *Perth, Western Australia*

**Research studentship.** Ab initio calculations with Prof. W. Walker.

1991

Curtin University of Technology, Department of Applied Mathematics. *Perth, Western Australia*

**Mathematics 100 tutor.**

November 1990 – February 1991

ALCOA of Australia Pty Ltd. *Pinjarra, Western Australia*

**Work experience.** Chemical engineering research project.

## PRIZES and AWARDS

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- 2002 & Renewed 2003 *Revson Foundation* Postdoctoral Fellowship (Cornell University).
- 2001 & Renewed 2002 *Keck Foundation* Postdoctoral Trainee Grant (Cornell University).
- 1994 *Australian Postgraduate Award* (The Australian National University). I was also the number one ranked applicant for this award at Curtin University.
- 1991-1993 *Vice Chancellors List* (Curtin University) for every semester of my degree: one of only three people to have done so. I achieved high distinctions in every course.
- 1993 *Australian Institute of Physics Prize* for highest academic performance.
- 1992 *Ronald Date Memorial Prize* for achievement in scientific data analysis.

## PUBLICATIONS

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1. **T. W. Allen**, O. S. Andersen and B. Roux. 2003. "The Energetics of Ion Conduction in the Gramicidin A Channel". *Proc. Nat. Acad. Sci.* In press.
2. **T. W. Allen**, O. S. Andersen and B. Roux. 2003. "The Structure of Gramicidin A in a Lipid Bilayer Environment Determined using Molecular Dynamics Simulations and Solid-State NMR Data." *J. Am. Chem. Soc.* **125**, 9868-9877.
3. **T. W. Allen**, T. Bastug, S. Kuyucak and S. H. Chung. 2003. "Gramicidin A Channel as a Test Ground for Molecular Dynamics Force Fields." *Biophys. J.* **84**, 2159-2168.
4. S-H. Chung, **T. W. Allen** and S. Kuyucak. 2002. "Conducting State Properties of the KcsA Potassium Channel from Molecular and Brownian Dynamics Simulations". *Biophys. J.* **82**, 628-645.
5. S. H. Chung, **T. W. Allen** and S. Kuyucak. 2002. "Modeling Diverse Range of Potassium Channels with Brownian dynamics." *Biophys. J.* **83**, 263-277. [Editorial: P.C. Jordan. 2002. "Unclogging a Pipe: Potassium Channel Pinball." *Biophys. J.* **83**, 2-4.]
6. B. Corry, M. Hoyles, **T. W. Allen**, M. Walker, S. Kuyucak and S-H. Chung. 2002. "Reservoir Boundaries in Brownian Dynamics Simulations of Ion Channels." *Biophys. J.* **82**, 1975-1982.

7. **T. W. Allen** and S-H. Chung. 2001. "Brownian Dynamics Study of an Open State Potassium Channel." *Biophys. Biochim. Acta.* **1515**, 83-91.
8. **B. Corry**, **T. W. Allen**, S. Kuyucak and S-H. Chung. 2001. "A Model of Calcium Channels." *Biophys. Biochim. Acta.* **1059**, 1-6.
9. **B. Corry**, **T. W. Allen**, S. Kuyucak and S-H. Chung. 2001. "Mechanisms of Permeation and Selectivity in Calcium Channels." *Biophys. J.* **80**, 195-214.
10. **A. Bliznyuk**, **A. P. Rendell**, **T. W. Allen** and S-H. Chung. 2001. "The Potassium Ion Channel: Comparison of Linear Scaling Semiempirical and Molecular Mechanics Representations of the Electrostatic Potential." *J. Phys. Chem. B.* **105**, 12674-12679.
11. **T. W. Allen**, **A. Bliznyuk**, **A. Rendell**, S. Kuyucak and S-H. Chung. 2000. "The Potassium Channel: Structure, Selectivity and Diffusion." *J. Chem. Phys.* **112**, 8191-8204.
12. **T. W. Allen**, S. Kuyucak and S-H. Chung. 2000. "Molecular Dynamics Estimates of Ion Diffusion in Model Hydrophobic and the KcsA Potassium Channel". *Biophys. Chem.* **86**, 1-14.
13. **T. W. Allen**, S. Kuyucak and S-H. Chung. 1999. "Molecular Dynamics Study of the KcsA Potassium Channel". *Biophys. J.* **77**, 2502-2516.
14. **T. W. Allen**, S. Kuyucak and S-H. Chung. 1999. "Effect of Hydrophobic and Hydrophilic Channels on Water and Ion Structure and Diffusion". *J. Chem. Phys.* **111**, 7985-7999.
15. **T. W. Allen**, S. Kuyucak and S-H. Chung. 1999. "Molecular and Brownian Dynamics Studies of the Potassium Channel". *Chem. Phys. Lett.* **313**, 358-365.
16. S-H. Chung, **T. W. Allen**, M. Hoyles and S. Kuyucak. 1999. "Permeation of Ions Across the Potassium Channel: Brownian Dynamics Studies". *Biophys. J.* **77**, 2517-2533.
17. S-H. Chung, M. Hoyles, **T. W. Allen** and S. Kuyucak. 1998. "Study of Ion Currents across a Model Membrane Channel Using Brownian Dynamics". *Biophys. J.* **75**, 793-809.
18. **T. W. Allen** and C. J. Burden. 1997. "Vector Positronium States in Three-dimensional QED". *Phys. Rev. D* **55**, 4954-4966.
19. **T. W. Allen** and C. J. Burden. 1996. "Positronium States in Three-dimensional QED". *Phys. Rev. D* **53**, 5842-5855.

#### Submitted to Journal

- **B. Roux**, **T. W. Allen**, S. Berneche and W. Im. 2003. "Theoretical Models of Ion Channels". Submitted to *Quart. Rev. Biophys.*
- **T. W. Allen**, O. S. Andersen and B. Roux. 2003. "On the Importance of Flexibility in Studies of Ion Permeation". Submitted to *Biophys. J.*

#### In Preparation

- **T. W. Allen**, O. S. Andersen and B. Roux. "Improved Free Energy Methods for the study of Ion Permeation in the Gramicidin Channel." For *Biophysical Journal*.
- **T. W. Allen**, D. Bisset and S-H. Chung. "Systematic Study of Solvent Dielectric Response within Ion Channels." For *Biophysical Journal*.

#### Recent Conference Contributions

- **T. W. Allen**, O. S. Andersen and B. Roux. 2003. "Structure of the Gramicidin A Channel in a Lipid Bilayer." New York Structural Biology meeting.
- **T. W. Allen**, O. S. Andersen and B. Roux. 2003. "The Structure of Gramicidin A in a Lipid Bilayer using Molecular Dynamics and Solid-State NMR Data." *Biophys. J. In press.*
- **T. W. Allen**, S. Kuyucak and S-H. Chung. 2002. "Conducting State Potassium Channel Models." *Biophys. J.* 339a.
- **T. W. Allen**, S. Kuyucak and S-H. Chung. 2001. "Molecular and Brownian Dynamics of the Potassium Channel." *Biophys. J.* 328a.
- **T. W. Allen**. 2001. "Microscopic and Macroscopic Studies of Ion Channels." Conference on Condensed Matter Physics, The Australian National University.