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Education

1983 B.S. Chemical Engineering, University of Illinois at Urbana-Champaign
 1986 Ph.D. Chemical Engineering, University of Minnesota
 1987 Postdoctoral Associate, Sandia National Laboratories-Albuquerque

Professional Experience (all at the University of Illinois at Urbana-Champaign)

1988–94 Assistant Professor of Chemical Engineering
 1994–97 Associate Professor of Chemical Engineering
 1997– Professor of Chemical Engineering
 2005–06 Interim Head of Chemical & Biomolecular Engineering
 2006–11 Head of Chemical & Biomolecular Engineering
 2006– James W. Westwater Professor of Chemical & Biomolecular Engineering
 2011–14 Provost Fellow (International Academic Programs)

Responsibilities and Accomplishments as Provost Fellow (2011–2014)

This Provost Fellow position functioned akin to a special-assignment associate provost, with a goal to build campus international activities – including integrating a global focus into campus strategic planning, fostering campus-level partnerships in other countries, and coordinating with colleges and departments to increase faculty participation in global initiatives. The position was part of the Provost's Cabinet and worked closely with the International Programs and Studies Office.

Revamp of Cooperative Doctoral Program in Singapore

- Cooperative doctoral program between UIUC and the Agency for Science, Technology & Research (ASTAR) had existed for several yrs with capacity to more than a dozen fully funded students per year, plus some operating expenses per student. I revamped the program's structure to reach full enrollment potential.
- Organized the creation of several technical themes (such as computational medicine) to provide focal points for engagement between UIUC faculty and ASTAR researchers, as well as specific project descriptions for use in recruiting potential students.
- Developed a new approach to student recruiting in cooperation with ASTAR

Creation of Program for Undergraduate Research Experiences Overseas

- Created an administrative, curricular, and oversight structure for large numbers of undergraduates to perform individual research in laboratories overseas, but for credit at the University of Illinois. Envisioned scale and structure of the program is unique in the US. The program was piloted successfully in Summer 2013 and at larger scale in summer 2014.

- Facilitated creation of a series of special course numbers all undergraduates in engineering, biological sciences and chemical sciences with the general title “Undergraduate Research Abroad,” implemented in Summer 2014.

Comprehensive Analysis of Administration of International Affairs at Illinois

- Led a campus effort to analyze comprehensively the current status, opportunities and challenges in the campus-level pursuit of UIUC’s global engagement in education, public engagement, economic development and research.
- 40-page analysis document was presented to senior campus leadership in Feb, 2012.
- Several key recommendations were implemented.

Responsibilities and Accomplishments as Head of Chemical & Biomolecular Engineering

(2005–2011)

The Head of Chemical & Biomolecular Engineering (ChBE) is the chief academic and executive officer of the department, having full decision-making authority for discretionary departmental budget, faculty and staff hiring, promotion and tenure, and curriculum. The position oversees the direction and implementation of alumni development and corporate relations. During my incumbency, personnel comprised up to 16 faculty, 2 lecturers, 4 support staff, 550 undergraduates, 110 graduate students (plus 20 non-ChBE students studying with ChBE faculty), and 25 postdocs/senior research staff.

Graduate Education and Research

- Created the first multi-institutional PhD degree at UIUC (with chemical engineering at National University of Singapore). Program provides full funding for up to 5 students/yr plus operating expenses for each student.
- Managed joint MS program (chemical engineering at National University of Singapore). Program provided full funding for nearly a dozen students per year, with funding from Singapore’s Economic Development Board and from about 20 US and overseas corporations.
- Oversaw increase in per-faculty research expenditures by >60% to 2nd highest on campus.
- Oversaw increase in graduate enrollment by roughly 30%.
- Oversaw increase in patents granted by roughly 300%.
- Facilitated movement of 3 faculty into leadership positions within campus research institutes.
- Reconfigured Annual Graduate Research Symposium, including use of corporate judges.
- Reconfigured structure of Graduate Student Advisory Committee.

Undergraduate Education

- Instituted a new program of team-based, project-oriented design experiences throughout the undergraduate curriculum – unique in the US for its scale.
- Instituted an optional biomolecular concentration to the chemical engineering BS degree, the first such concentration for the department.
- Instituted a biomolecular minor for undergraduate non-majors.
- Oversaw increase in undergraduate enrollment by roughly 75%.
- Instituted an ongoing outcomes/assessment process for undergraduate curriculum.
- Instituted Annual Undergraduate Research Symposium.
- Instituted Annual Undergraduate Awards Ceremony.

Faculty Affairs

- Increased faculty size to the largest in its history (16) up to that time by adding six new faculty.

Since then, all six have received major national awards.

- Created, with indispensable faculty assistance, a comprehensive strategic plan for education, research, public engagement and economic development together with the required financial support for staffing and infrastructure.
- Oversaw a successful full-professor promotion process based primarily on public engagement rather than research or teaching – the first ever for the UIUC campus.
- Instituted mentoring program for junior faculty.

External Relations and Advancement

- Oversaw and implemented departmental development campaign that raised several million dollars, with new endowments for several chairs, professorships, graduate fellowships and undergraduate scholarships.
- Completely reconfigured departmental corporate relations efforts, including creation of a Corporate Relations Advisory Council with senior corporate VPs and a venture capitalist.
- Created a Local Corporate Partners program (in collaboration with Chemistry Dept).
- Designed and hosted a Special Symposium: “Evolving Opportunities in Chemical Engineering for a Global Community,” including roughly ten senior corporate executives.
- Completely revamped departmental Web site (twice).
- Developed regular (3 issues/yr) glossy 10-page news brochure for alumni and friends, which did not exist previously. Current-use annual giving increased by a substantial fraction thereafter.
- Developed new brochures for alumni relations, corporate relations, prospective undergraduate students, and prospective graduate students. Few such materials had existed previously.

Financial Affairs

- Developed a new financial planning and accounting model for the unit (with associated software tools).
- Reconfigured staff operations to accommodate large growth in student and faculty numbers, yet decreased staff size.
- Remodeled and upgraded undergraduate computer laboratory and created a new, sustainable financial model for it.
- Developed a new financial model for department laboratory courses (to replace loss of state funds) based on corporate/alumni development and undergraduate differential tuition.
- Created new undergraduate advising structure in cooperation with the School of Chemical Sciences to improve advising quality while reducing departmental costs.

Diversity

- Oversaw re-energizing of several tutoring programs for students from underrepresented groups.
- Re-energized student chapter of National Organization of Black Chemists and Chemical Engineers.
- Undertook a detailed data-mining and analysis effort to examine the unit’s two-decade history of retention rates for under-represented groups. Study led to implementation of individualized performance agreements between students on academic probation and their advisors.
- Improved graduate enrollment of underrepresented minorities from multi-year averages of 2% to 6%.
- Improved graduate enrollment from multi-year averages of 32% to 36%.

Selected University Service Activities (last 7 yrs)

- Campus Committee (ad hoc) on Revenue Generation. We met several times with local community and business leaders to discuss ways in which the campus could partner with these constituencies in Urbana-Champaign to realize the University's full potential as the largest employer and chief driver of the local economy.
- Campus Committee (ad hoc) on Creating an Undergraduate Major in Energy
- Facilitator, Campus Academic Leadership Roundtable Discussion Group. This is a campus-wide organization of about fifteen administrators and faculty from all reaches of the university.
- College of Engineering Executive Committee
- College of Engineering Administrative Committee
- College of Engineering Committee on Global Affairs
- College of Engineering Task Force on Growth (undergraduate programs)
- College of Engineering Grievance Committee
- College of Liberal Arts & Sciences General Education Council
- College of Liberal Arts & Sciences Courses & Curricula Committee
- College of Liberal Arts & Sciences Committee (ad hoc) on Corporate Relations
- College of Liberal Arts & Sciences Awards Committee
- School of Chemical Sciences Executive Committee

Collaborations with Corporate Sector (as an individual faculty member over entire career)

- Semiconductor Research Corporation (research contract)
- SEMATECH (research contract, consulting)
- Intel (educational philanthropy)
- Applied Materials (research contract and collaboration, educational philanthropy)
- Varian Semiconductor Equipment Associates (research collaboration)
- Chartered Semiconductor Manufacturing (research collaboration)
- AGI Inc. (research collaboration)
- Shipley Corporation (educational philanthropy)
- Evans Analytical Group (research collaboration)
- Dow Chemical (educational philanthropy)
- DuPont (consulting)

Selected Professional Service Activities

- 1998– Manufacturing Science/Technology Group of AVS Science & Technology Society: Co-Chair, 2002–13; Progr. Chair, 2002; Treasurer, 2000–13; Progr. Committee, 1998–
- 2001–03 Program Chair for Electronic Materials Group, American Institute of Chemical Engineers (AIChE)
- 2006–08 Co-organizer (with 2 others) and Proceedings Chair, 17th International Conference on Ion Implantation Technology
- 2008– International Governance Committee, International Conference on Ion Implantation Technology
- 2007–11 Executive Council Officer, Materials Engineering & Sciences Division, AIChE. Succeeded from 2nd Vice-Chair through 1st Vice-Chair through Chair to Past Chair.
- 2009–11 Advisory Board, Washington Univ (St. Louis) Dept. of Energy, Environmental &

- Chemical Engineering
- 2009–13 Advisory Board Chair, Univ of Colorado Dept. of Chemical & Biological Engineering
- 2012–14 Director, Materials Engineering & Sciences Division, AIChE.
- 2013–16 Electorate Nominating Committee, Engineering Section, American Association for the Advancement of Science (AAAS)
- 2013–16 Electorate Nominating Committee, Industrial Science & Technology Section, AAAS. Presently a candidate for Section Chair.

Professional Awards

- 1988 NSF Presidential Young Investigator Award
- 1988 Dow Teaching Excellence Award
- 1989 DuPont Young Faculty Award
- 1989, 91 Observer for United States, IUPAC General Assembly
- 1994 Alfred P. Sloan Research Fellow (Chemistry)
- 1995 Inventor Recognition Award, Semiconductor Research Corporation
- 1996 Teaching Excellence Award, School of Chemical Sciences, UIUC
- 2000 Fellowship for Study in a Second Discipline (Philosophy), UIUC
- 2001 Fellow, AVS: the Science & Technology Society
- 2004–06 IEEE Electron Device Society Distinguished Lecturer
- 2004 Beckman Associate, Center for Advanced Study, UIUC
- 2005 Excellence in Advising Award, College of Engineering, UIUC
- 2007 Fellow, American Association for the Advancement of Science
- 2008 Fellow, American Physical Society
- 2008 Triennial Paper Prize for Theory/Methodology, *J. Process Control* (with 7 co-authors)
- 2011 Fellow, American Institute of Chemical Engineers

Books

1. Edmund G. Seebauer and Robert L. Barry, *Fundamentals of Ethics for Scientists and Engineers* (Oxford Univ. Press, New York, 2001), 270 pp. With instruction manual, 180 pp. Translated into Korean (Kyungpook Univ. Press, Daegu, 2013).
2. Edmund G. Seebauer and Meredith C. Kratzer, *Charged Semiconductor Defects: Structure, Thermodynamics and Diffusion* (Springer, London, 2009), 294 pp.
3. Edmund G. Seebauer, Susan B. Felch, Amitabh Jain, and Yevgeniy V. Kondratenko (eds.), *17th International Conference on Ion Implantation Technology*, Monterey, CA, 8-13 June 2008, AIP Conference Proceedings (Materials Physics and Applications), Vol. 1066 (AIP, New York, 2009).

Patents

4. M. A. Mendicino and E. G. Seebauer, "Selective Low-Temperature Chemical Vapor Deposition of Titanium Disilicide onto Silicon Regions," U.S. Patent No. 5,633,036 granted 5/27/97.
5. Edmund G. Seebauer, Richard D. Braatz, Michael Y. L. Jung and Rudyanto Gunawan, "Methods for Controlling Dopant Concentration and Activation in Semiconductor Structures," U.S. Patent No. 7,846,822 granted 12/07/10.
6. Edmund G. Seebauer, "Preparation of Ultra-shallow Semiconductor Junctions Using Intermediate Temperature-ramp Rates and Solid Interfaces for Defect Engineering," U.S. Patent No. 7,968,440 granted 6/28/11.
7. Edmund G. Seebauer, "Defect Engineering in TiO₂ via Surfaces," U.S. Patent No. 8,871,670

granted 10/28/14.

8. Edmund G. Seebauer and Prashun Gorai, "Composition Comprising an Engineered Defect Concentration," U.S. Nonprovisional Patent application 15/134,560 filed 4/21/2016.

Book Chapters, Invited Reviews, and Trade Publications

9. M. A. Mendicino, R. P. Southwell and E. G. Seebauer, "Chemical Vapor Deposition of TiSi_2 Using SiH_4 and TiCl_4 ," *Thin Solid Films*, **253** (1994) 473-478.
10. E. G. Seebauer and C. E. Allen, "Estimating Surface Diffusion Coefficients," *Progr. Surf. Sci.*, **49** (1995) 265-330.
11. R. P. Southwell, M. A. Mendicino and E. G. Seebauer, "Optimization of Selective TiSi_2 CVD by Mechanistic Chemical Kinetics," *J. Vac. Sci. Technol.*, **A14** (1996) 928-934.
12. I. I. Suni and E. G. Seebauer, "Surface Self-Diffusion at High Temperatures: New Simulational Insights," *Thin Solid Films*, **272** (1996) 229-234.
13. E. G. Seebauer and R. Ditchfield, "Fixing Hidden Problems with Thermal Budget," *Solid State Technol.*, **40** (1997) 111-120.
14. E. G. Seebauer and C. E. Allen, "Surface Diffusion," in: *Landolt-Börnstein Numerical Data and Functional Relationships: Diffusion in Semiconductors*, Vol. III/33A, ed. D. L. Beke, (Springer Verlag, New York, 1998) Ch. 7.
15. E. G. Seebauer and C. E. Allen, "Surface Diffusion," in: *Landolt-Börnstein Numerical Data and Functional Relationships: Diffusion in Nonmetallic Solids*, Vol. III/33B, ed. D. L. Beke, (Springer Verlag, New York, 1999) Ch. 12.
16. E. G. Seebauer and M. Y. L. Jung, "Surface Diffusion of Adsorbates on Metals, Alloys, Oxides and Semiconductors," in: *Landolt-Börnstein Numerical Data and Functional Relationships: Adsorbed Layers on Surfaces*, Vol. III/42A, ed. H. P. Bonzel, (Springer Verlag, New York, 2001) Ch. 11.
17. E. G. Seebauer, "When Do You Blow the Whistle?" *Chemical Engineering*, **108** (April, 2001) 123-126.
18. E. G. Seebauer and H. Y. H. Chan, "Microelectronics Research in Chemical Engineering: A Metaphorical View," *Reviews in Chemical Engineering*, **18** (2002) 1-47.
19. Edmund G. Seebauer, "Whistleblowing: Is It Always Obligatory?" *Chemical Engineering Progress*, **100** (2004) 23-27.
20. Edmund G. Seebauer and Charlotte T. M. Kwok, "Microelectronics Fabrication," in *Encyclopedia of Chemical Processing*, ed. Sunggyu Lee (Taylor & Francis, 2005).
21. R. D. Braatz, R. C. Alkire, E. G. Seebauer, E. Rusli, R. Gunawan, T. O. Drews, X. Li, and Y. He, "Perspectives on the Dynamics and Control of Multiscale Systems," *J. Process Control*, **16** (2006) 193-204.
22. Edmund G. Seebauer and Meredith C. Kratzer, "Charged Point Defects in Semiconductors," *Materials Science & Engineering R*, **55** (2006) 57-149.
23. R. D. Braatz, R. C. Alkire, E. G. Seebauer, T. O. Drews, E. Rusli, M. Karulkar, F. Xue, Y. Qin, M. Y. L. Jung and R. Gunawan, "A Multiscale Systems Approach to Microelectronic Processes," *Comp. & Chem. Eng.*, **30** (2006) 1643-1656.
24. R. D. Braatz, R. C. Alkire and E. G. Seebauer, "Multiscale Modeling and Design of Electrochemical Systems," in *Electrochemical Surface Modification – Thin Films, Functionalization and Characterization, Advances in Electrochemical Science and Engineering*, ed. R. C. Alkire, D. M. Kolb, J. Lipkowski, and P. N. Ross (Wiley-VCH, Weinheim, Germany, 2008) **10**, Ch. 4, pp. 289-334.

25. Edmund G. Seebauer, Paul J. A. Kenis and Marina Miletic, "Chemical Engineering at Illinois," *Chemical Engineering Education*, **43** (2009) 179-185.
26. Edmund G. Seebauer and Prashun Gorai, "Formation of Ultra-Shallow Junctions," *Comprehensive Semiconductor Science & Technology*, ed. Roberto Fornari (Elsevier, Amsterdam, 2010) **4**, Ch. 4, pp 86-131.
27. Edmund G. Seebauer and Kyong Wook Noh, "Trends in Semiconductor Defect Engineering at the Nanoscale," *Materials Science & Engineering R*, **70** (2010) 151-168.
28. Edmund G. Seebauer, "Fundamentals of Ethics: The Use of Virtues," *Practical Ethics for the Food Professional*, ed. J. Peter Clark and Christopher Ritson (Wiley-Blackwell, 2013) Ch. 1.
29. Edmund G. Seebauer and D. Eitan Barlaz, "SIMS for Analysis of Nanostructures," *Current Opinion in Chemical Engineering*, **12** (2016) 8-13.

Refereed Journal Publications

30. Edward P. Duliba, Edmund G. Seebauer and R. L. Belford, "Nuclear Quadrupole Coupling in an EPR Investigation of a Low-Spin Cobalt (II) System," *J. Magnetic Resonance*, **49** (1982) 507-516.
31. Edmund G. Seebauer, Edward P. Duliba, Duane A. Scogin, Robert B. Gennis and R. L. Belford, "EPR Evidence on the Structure of the Copper (II)-Bacitracin A Complex," *J. Am. Chem. Soc.*, **105** (1983) 4926-4929.
32. Edmund G. Seebauer, John M. Vohs and Richard I. Masel, "Effects of Artificial Protrusions on Self-Sustained Thermal Oscillations during Hydrogen Oxidation on Nickel," *Ind. Eng. Chem. Fund.*, **23** (1984) 19-24.
33. E. G. Seebauer and L. D. Schmidt, "Surface Diffusion of Hydrogen on Pt(111): Laser-Induced Thermal Desorption Studies," *Chem. Phys. Lett.*, **123** (1986) 129-133.
34. E. G. Seebauer, A. C. F. Kong and L. D. Schmidt, "Adsorption and Desorption of NO, CO and H₂ on Pt(111): Laser-Induced Thermal Desorption Studies," *Surface Science*, **176** (1986) 134-156.
35. E. G. Seebauer, A. C. F. Kong and L. D. Schmidt, "Investigations of Adsorption on Pt and Rh by Laser-Induced Desorption," *J. Vac. Sci. Technol.*, **A5** (1987) 464-468.
36. S. Y. Hwang, E. G. Seebauer and L. D. Schmidt, "Decomposition of CH₃NH₂ on Pt(111)," *Surface Science*, **188** (1987) 219-234.
37. E. G. Seebauer, A. C. F. Kong and L. D. Schmidt, "Laser-Induced Desorption of Polyatomic Molecules with a CO₂ Laser," *Appl. Surface Science*, **29** (1987) 380-390.
38. E. G. Seebauer, A. C. F. Kong and L. D. Schmidt, "The Coverage Dependence of the Pre-exponential Factor for Desorption," *Surface Science*, **193** (1988) 417-436.
39. E. G. Seebauer, A. C. F. Kong and L. D. Schmidt, "Surface Diffusion of CO and Hydrogen on Rh(111): Laser-Induced Thermal Desorption Studies," *J. Chem. Phys.*, **88** (1988) 6597-6604.
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41. E. G. Seebauer, "Oxidation and Annealing of GaAs(100) Studied by Photoreflectance," *J. Appl. Phys.*, **66** (1989) 4963-4972.
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44. K. A. Schultz and E. G. Seebauer, "Low Stress, Coolable Sample Mount for Ultrahigh Vacuum Studies of Fragile Semiconductors," *Rev. Sci. Instrum.*, **63** (1992) 218-219.

45. K. A. Schultz, I. I. Suni, C. E. Allen and E. G. Seebauer, "Optical Second Harmonic Study of Sb Adsorption on Ge(111)," *Surface Science*, **276** (1992) 40-49.
46. K. A. Schultz and E. G. Seebauer, "Surface Diffusion of Sb on Ge(111) Monitored Quantitatively with Optical Second Harmonic Microscopy," *J. Chem. Phys.*, **97** (1992) 6958-6967.
47. M. A. Mendicino and E. G. Seebauer, "Adsorption of TiCl₄ on Si(100)," *Surface Science*, **277** (1992) 89-96.
48. M. A. Mendicino and E. G. Seebauer, "Adsorption of Chlorine on Si(100)," *Appl. Surface Science*, **68** (1993) 285-290.
49. M. A. Mendicino and E. G. Seebauer, "The Use of Teflon for Minimizing Spurious Reactions in Gas Dosing and Detection Systems," *J. Vac. Sci. Technol.*, **A10** (1992) 3590-3592.
50. K. A. Schultz, I. I. Suni and E. G. Seebauer, "Microscopy of Adsorbates by Surface Second Harmonic Generation," *J. Opt. Soc. Am. B*, **10** (1993) 546-550.
51. M. A. Mendicino and E. G. Seebauer, "Adsorption of TiCl₄, SiH₄ and HCl on Si(100): Application to TiSi₂ CVD and Si Etching," *J. Electrochem. Soc.*, **140** (1993) 1786-1793.
52. M. A. Mendicino and E. G. Seebauer, "Detailed *In-Situ* Monitoring of Film Growth: Application to TiSi₂ CVD," *J. Crystal Growth*, **134** (1993) 377-385.
53. C. R. Carlson, W. F. Buechter, F. Che-Ibrahim and E. G. Seebauer, "Adsorption/Desorption Kinetics of H₂O on GaAs(100) Measured by Photoreflectance," *J. Chem. Phys.*, **99** (1993) 7190-7197.
54. I. I. Suni and E. G. Seebauer, "A New Physical Picture for Surface Diffusion at High Temperatures," *Surface Science*, **301** (1994) L235-238.
55. I. I. Suni and E. G. Seebauer, "Surface Diffusion of In on Ge(111) Studied by Optical Second Harmonic Microscopy," *J. Chem. Phys.*, **100** (1994) 6772-6777.
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58. R. P. Southwell and E. G. Seebauer, "Differential-Conversion Temperature Programmed Desorption: A New Method for Obtaining Bimolecular Surface Rate Constants," *Surface Science*, **340** (1995) 281-292.
59. C. E. Allen and E. G. Seebauer, "Surface Diffusion of Sb on Si(111) Measured by Second Harmonic Microscopy," *Langmuir*, **11** (1995) 186-190.
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63. C. E. Allen and E. G. Seebauer, "Surface Diffusivities and Reaction Rate Constants: Making a Quantitative Experimental Connection," *J. Chem. Phys.*, **104** (1996) 2557-2565.
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69. R. Ditchfield and E. G. Seebauer, "Rapid Thermal Processing: Fixing Problems with the Concept of Thermal Budget," *J. Electrochem. Soc.*, **144** (1997) 1842-1849.
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