Alex Ignatiev

CURRICULUM VITAE

DATE OF BIRTH February 14, 1945, Wehingen, Germany, US Citizen

EDUCATION

Ph.D.	Cornell University	1972	Materials Science
B.S.	University of Wisconsin-Milwaukee	1966	Applied Mathematics and Engineering Physics

PROFESSIONAL EXPERIENCE

2014 - present	Chief Science Officer, Metal Oxide Technologies, Inc., Houston, TX
2013-present	Member, International Advisory Board, Tomsk State University,Tomsk, Russia
2013-present	Advisor, Board of Directors, PARASAT Joint Stock Company, Astana, Kazakhstan
2013 – Present	Member, Board of Directors, Applied Optoelectronics, Inc., Sugarland, TX
2011 – Present	Rector's Advisory Board-Friends of Al-Farabi, Al-Farabi Kazakh National University, Almaty, Kazakhstan
2010 – Present	Hugh Roy and Lillie Cranz Cullen Professor of Physics, Chemistry, and Electrical and Computer Engineering, Universtiy of Houston
2009-2012	World Class University Professor, Gwangju Institute of Science and Technology, Gwangju, South Korea
2008 – Present	Vice President, Nano EnerTex, Inc., Houston, TX
2008-2009	Member, Board of Directors, Applied Optoelectronics, Inc., Sugarland, TX
2007-2011	Member, Technical Advisory Board, Unity Semiconductor Corp., San Jose, CA
2005 - Present	Director, Center for Advanced Materials, University of Houston
2003 – 2010	Distinguished University Professor of Physics, Chemistry, and Electrical and Computer Engineering, University of Houston
2002-2005	Director, Texas Center for Superconductivity and Advanced Materials, University of Houston
2002-2003	Member, Board of Directors, Applied Optoelectronics, Inc., Sugarland, TX
2002 - 2014	Chief Technology Officer, Metal Oxide Technologies, Inc., Houston, TX
1998-2003	Professor of Physics, Chemistry and Electrical and Computer Engineering, University of Houston
1988-2002	Director, Space Vacuum Epitaxy Center, University of Houston

1987-2008	Task Leader, Texas Center for Superconductivity
1986-1988	Associate Director, Space Vacuum Epitaxy Center, University of Houston
1984-1989	Associate Director, Magnetic Information Research Laboratory, University of Houston
1983-1998	Professor of Physics and Chemistry, University of Houston
1983	Senior Fulbright Scholar, University of Split, Yugoslavia
1982-1983	Professor of Physics, University of Houston
1977-1978	Visiting Lektor/Associate Professor, Institute of Physics, Aarhus University, Aarhus, Denmark
1977-1982	Associate Professor of Physics, University of Houston
1974-1999	Member, Energy Laboratory, University of Houston
1974-1977	Assistant Professor of Physics, University of Houston
1972-1974	Research Associate, State University of New York at Stony Brook
1967-1971	Graduate Research Assistant, Cornell University
1966	Industrial Consultant, Pope Scientific Company, Menomonee Falls, Wisconsin
1966-1967	Graduate Research Assistant, University of Wisconsin-Milwaukee

CREDITS

Honors:

2012 NASA Deep Space Habitat Project Award

2011 Elected to the Kazakhstan National Academy of Natural Science

2000 Elected to the International Academy for Astronautics

1997 Texas State Senate Recognition Award

1995 City of Houston Science Recognition Award

1994 UH Alumni Award - Dallas Area UH Alumni Group

1994 UH College of Natural Science and Mathematics Alumni Achievement Award

1994 City of Houston “Alex Ignatiev Day” Recognition Award

1994 NASA - JSC Group Achievement Award

Editorial:

Associate Editor “Vacuum”

Associate Editor “Integral”

MANUSCRIPT REVIEW:

National Academy of Sciences

Physical Review

Physical Review Letters

Nature

Surface Science

Science

Thin Solid Films

Journal of Vacuum Science and Technology

Solar Energy Materials and Solar Cells

Solid State Communications

Journal of Applied Physics

Applied Physics Letters

Vacuum

PROPOSAL REVIEW:

National Science Foundation

Department of Energy

Stanford Synchrotron Radiation Laboratory

U.S. Army Research Office

NASA

Petroleum Research Fund

Australian Research Council

Hong Kong Research Council

Civilian Research Development Fund

ORGANIZING COMMITTEES:

32 National Symposium, American Vacuum Society (Local Arrangements Chairman, 1985)

V International Conference on Ion Beam Analysis (1981)

Southwest Spectroscopy Conference (1980 and 1983)

American Vacuum Society – Annual Meeting Organizing Committees (1984-1987)

Space Processing Technical Committee - American Institute of Aeronautics and Astronautics [AIAA] (1988 - 2000)

Materials Research Society - Symposium on Space Compatible Materials (1989)

2nd Int. Conf. on CBE (1989) [ICCBE-2]

Space Technology, Commerce and Communication (1987, 1988, 1989)

Annual Meeting of Centers for the Commercial Development of Space (1992)

Space Processing Symposium, Space Commercialization Conference (1995), (1996), (1997)

International Aeronautical Federation Symposium IAA Materials Science Program Chair (1997, 1998, 1999, 2000)

International Aeronautical Federation Symposium Space Power Program Committee (1999, 2000, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013)

Conference on New Theories, Discoveries, and Applications of Superconductors and Related Materials Advisory Committee (2000, 2001, 2003,2004, 2007, 2008,2009, 2010, 2011)

Space Resources Roundtable Advisory Committee (2001, 2002, 2003, 2004, 2005, 2006, 2007)

International Lunar Conference 2003

American Institute of Aeronautics and Astronautics [AIAA] Space Colonization Technical Committee (Co-Chair, 2005, 2006)

Space Technology and Information Forum (Space Colonization Symposium Co-Chair , 2004, 2005, 2006)

Japan-U.S. Science, Technology & Space Applications Program, co-chair 2005, 2006, 2007

50th Anniversary of the Siberian Branch of the Russian Academy of Sciences Conference, co-chair 2007, 2009

Symposium on Nanotechnology Energy and Space , Chair, Organizing Committee, 2009, 2011, 2013

PROFESSIONAL AND HONORARY SOCIETIES

American Physical Society

American Vacuum Society

Sigma Xi

The American Association for the Advancement of Science

American Chemical Society

The Materials Research Society

American Institute of Aeronautics and Astronautics

American Astronautical Society

International Society of Optical Engineering

Institute for Electrical and Electronic Engineers

American Society of Mechanical Engieers

PATENTS

1. Freundlich, A. Bensaoula, M. Vileila, and A. Ignatiev, "Tandem Solar Cell with Imporoved Tunnel Junction", Patent Number: 5,407,491; 1995.

2. He Lin, Alex Ignatiev, Nai Juan Wu, " Three-terminal non-volatile ferroelectric/superconductor thin film field effect transistor" Patent Number: 5,686,745; 1997.

3. Y.S. Chen, S. Liu, N.J. Wu, and A. Ignatiev, "Birefringent Grating Polarizing Beam Splitter", Patent Number: 5,914,811; 1999.

4. A. Freundlich and A. Ignatiev, " Quantum well thermophotovolataic Energy Converters", Patent Number: 6,150,604; 2000.

5. N. J. Wu and A. Ignatiev, "Treating Retinal Damage by Implanting Thin Film Optical Detectors", Patent Number : 5,873,901; 1999

6. Sangqing Liu, Naijuan Wu, Alex Ignatiev, "Method for switching the properties of perovskite materials", Patent Number: US 6,204,139; 1998

7. Shangqing Liu, Naijuan Wu , Alex Ignatiev, and E. Joseph Charlson, "Electrically Variable Multi-State Resistance Computing", Patent Number: 6,473,332; 2002.

8. Xin Chen, Yimin Chen, NaiJuan Wu and Alex Ignatiev, "Biaxially Textured Single Buffer Layer for Superconductive Articles" (Filed: US 2004/0157747 A1)

9. Alex Ignatiev, Xin Zhang, Jian Ming Zeng, JiaShu Liu, PenChu Chou, Louis D. Castellani, " Method And Apparatus For Forming A Thin Film On A Tape Substrate" (Filed: US 2004/0016401 A1)

10. Alex Ignatiev, Xin Zhang, Jian Ming Zeng, JiaShu Liu, PenChu Chou, Louis D. Castellani, " Method And Apparatus For Superconductor Material On A Tape Substrate" (Filed: US 2004/0016401 A1)

11. Alex Ignatiev, Xin Zhang, Jian Ming Zeng, JiaShu Liu, PenChu Chou, Louis D. Castellan, "System for Forming Superconductor Material On A Tape Substrate" (Filed: US20120318196 A1)

12. Shangqing Liu, Naijuan Wu, Jianren Li, and Alex Ignatiev, "Electrically Programmable Nonvolatile Variable Capacitor" Patent Number: 6,762,481; 2004

13. Xin Chen, Naijuan Wu, Alex Ignatiev , "Thin film solid oxide fuel cell and method for forming" Patent Number: US 6,645,656; 2003

14. Naijuan Wu, Xin Chen, Alex Ignatiev; "Switchable resistive perovskite microelectronic device with multi-layer thin film structure" Published # 20050151156

15. Alex Ignatiev, "A Superconducting Electromagnetic Linear Motor Rock Pulverizer" (2006-Filed).

16. Ali Reza Zomorrodian, Naijuan Wu, and Alex Ignatiev, Charles Garcia, "Thin film optical detectors for retinal implantion and methods for making and using same", US 7,067,327 ; 2006

17. X. Chen, N.J. Wu and A. Ignatiev, "Thin film solid oxide fuel cell and method for forming-II", U.S. Patent Number: 7,381,492; 2008

18. Naijuan Wu, Ali Reza Zomorrodian, and Alex Ignatiev, "Thin film optical detectors for retinal implantion and methods for making and using same", Patent Number: 7,400,021; 2008

19. X. Chen, N.J. Wu and A. Ignatiev, and Yuxiang Zhou, "Thin film solid oxide fuel cell with lithographically patterned electrolyte and anode layers," Patent Number: 7,510,819; 2009

20. Naijuan Wu, Xin Chen, Alex Ignatiev, "Switchable resistive perovskite microelectronic device with multi-layer thin film structure", Patent Number: 7,608467; 2009

21. Naijuan Wu, Xin Chen, Alex Ignatiev, "Method of using a switchable resistive perovskite microelectronic device with multi-Layer thin film structure", Patent Number: 7,955,871; 2011

22. Naijuan Wu, Xin Chen, Alex Ignatiev , "Switchable two terminal multi-layer perovskite thin film resistive device and methods thereof", 8,089,111 B2, 3012

23. Naijuan Wu, Xin Chen, Alex Ignatiev, "Method of using a buffered electric pulse induced resistance device" Patent Number: 8,409,879 (2013)

24. Alex Ignatiev, Kristina Young, Rabi Ebrahim and NaiJuan Wu, Methosd of Usiang a Two-barrier Multi-Layer Thin Film Resistance Switching Device with a DSiffusion Barrier", Patent Number 939,058; 2015

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2. A. Ignatjevs, T. N. Rhodin, S. Y. Tong, B. I. Lundquist and J. B. Pendry, "LEED Spectra Study of Temperature Effects in Crystalline Xenon Surfaces," Sol. State Comm. 9, 1851 (1971).

3. A. Ignatiev, A. V. Jones and T. N. Rhodin, "LEED Investigations of Xenon Single Crystal Films and Their Use in Studying the Ir(100) Surfaces," Surf. Sci. 30, 573 (1972).

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6. A. Ignatiev, F. Jona, D. W. Jepsen and P. M. Marcus, "The Structure of Overlayers. I. Se on Ag (001)," Surf. Sci. 40, 439 (1973).

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8. A. Ignatiev and F. Jona, "Surface Debye Temperature of the Si(001) 2x2 Structure," Surf. Sci. 42, 605 (1974).

9. A. Ignatiev, F. Jona, D. W. Jepsen and P. M. Marcus, "The Atomic Arrangement in the 1x1 Structure of a Silicon Ordered Monolayer on Mo(001)," J. Vac. Sci. Tech. 12, 226 (1975).

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12. A. Ignatiev, F. Jona, D. W. Jepsen and P. M. Marcus, "The Structure of the Clean Mo(001) Surface," Phys. Rev. B11, 4287 (1975).

13. B. W. Lee, A. Ignatiev, S. Y. Tong and M. A. Van Hove, "Surface Contraction of the Clean W(001) Face," J. Vac. Sci. Tech. 14, 291 (1977).

14. C. Doland, P. O'Neill and A. Ignatiev, "The Particulate Nature of Solar Absorbing Films of Gold Black," J. Vac. Sci. Technol. 14, 259 (1977).

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16. F. Jona, H. D. Shih, A. Ignatiev, D. Jepsen and P. Marcus, "Probable Atomic Structure of Reconstructed Si(001) 2x1 Surfaces Determined by LEED," J. Phys. C 10, L67 (1977).

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21. J. A. Taylor, G. M. Lancaster, A. Ignatiev and J. W. Rabalais, "Interactions of Ion Beams with Surfaces: Reactions of Nitrogen with Silicon and its Oxides," J. Chem. Phys. 68, (1978).

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23. P. O'Neill and A. Ignatiev, "The Influence of Microstructure on the Optical Properties of Particulate Materials: Gold Black," Phys. Rev. B 15, (1978).

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54. G. Zajac and A. Ignatiev, "The High Temperature Effects of Substrate Oxidation on the Optical Responses of a Selective Solar Absorber," Thin Solid Films 9, 131 (1982).

55. A. Ignatiev, G. Zajac and G. B. Smith, "Solar Absorber Material Stability Under High Solar Flux," Proc. SPIE LA '82 Sym. 324, 170 (1982).

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23. Alex Ignatiev, Alex Freundlich, Michael B. Duke, Sanders D. Rosenberg, and Darby Makel, "The Fabrication of Silicon Solar Cells on the Moon using In-Situ Resources", Proc. 50th IAF, (Rio de Jeniero, 2000).

24. Michael B. Duke, Alex Ignatiev, Alex Freundlich, Sanders D. Rosenberg, and Darby Makel, "Silicon PV Cell Production On The Moon as the Basis for a New Architecture for Space", Proc. STAIF, (2001).

25. W. W. Zhuang, W. Pan, B. D. Ulrich, J. J. Lee, L. Stecker, A. Burmaster, D. R. Evans, S. T. Hsu, M. Tajiri, A. Shimaoka, K. Inoue, T. Naka, N. Awaya, K. Sakiyama, Y. Wang, S. Q. Liu, N. J. Wu, A. Ignatiev, "Novel Colossal Magnetoresistive Thin Film Nonvolatile Resistance Random Access Memory (RRAM)", IEDM '02 Digest. International, 8-11 Dec. (2002) pp. 193-196.

26. A. Ignatiev, X. M. Liao, Y. B. Nian, X. Chen, Z. J. Tang, C. Papagianni, N. J. Wu, J. R. Liu, W. K. Chu, "Fabrication and properties of electrical pulse induced resistive memory," Proc. Non Volatile Memory Technology Symposium, 18-1, (2003).

27. Manufacture of Solar Cells on the Moon, A. Freundlich , A. Ignatiev , C. Horton, M. Duke, P. Curreri and L. Sibille, PROC. 31ST IEEE PHOTOVOLTAIC SPECIALIST CONFERENCE, IEEE Catalog Number: 05CH37608C pp 794-797 (2005).

28. X. Chen, N. J. Wu, L. Smith,J.R. Li, and A. Ignatiev, "Thin Film Solid Oxide Fuel Cell for Lower Temperature Operations", Proc. Intl Conference on Electrosciene and Tech for Naval Engineering, p31 (2005).

29. "Solar Cell Fabrication on the Moon from Luanr Resources", A. Ignatiev and A. Freundlich, Proce 57th International Astronautical Congress, (Valencia, Spain 2006)

30. A. Ignatiev, N.J. Wu, S.Q. Liu, X. Chen, Y.B. Nian, C. Papaginanni, J. Strozier, Z. W. Xing, "Resistance switching memory effect in transition metal oxide thin films," Proc. 7th Annual Non-volatile Memory Technology Symposium, 11/5-11/8, 2006, San Francisco, P. 100.

31. A. Ignatiev, "Balancing Low Energy Sources and High Power Requirements on the Moon", Research Enabled by the Luanr Envronment Conf, National Academy of Sciences, June 2007.

32. X. Chen, J. Strozier, N. J. Wu, A. Ignatiev, Y. B. Nian, "A Study of Apparent Symmetry Breakdown in Perovskite Oxide-based Symmetric RRAM Devices," cond-mat/0510059

33. C. Garcia, S. Uwaydat, T. Bensaoula, A. Zomorrodian, N. J. Wu and A. Ignatiev, " The Thin Film Optical Detector: A Novel Approach to Artificial Vision", Chapter 74: Vitreoretrinal Surgical Techniques, ed: G. A. Peyman, S. A. Meffert, M. D. Conway (Taylor & Francis, 2007).

34. Alex Ignatiev, Alexandre Freundlich. Klaus Heiss and Christopher Vizas, "Solar Cell Fabrication on the Moon from Lunar Resources", Lunar Settlements, ed; H. Benaroya (CRC Press, 2009).

COMMITTEES AND ADMINISTRATIVE SERVICE, UNIVERSITY OF HOUSTON

1976-1977	Chairman, Graduate Studies Committee, Physics Department
1976-1978	Member, Undergraduate Council
1978-1979	Secretary, Faculty Senate
1978-1980	Member, Chancellor's Research Advisory Committee
1978-1981	Member, University Resource Reallocation Committee
1979	Associate Chairman, Physics Department
1980	Member, Faculty Senate Executive Committee
1981	Member, Campus 6-year Plan Council
1981	Member, Search Committee, Dean, Natural Science and Mathematics
1980-1983	Member, University Fringe Benefits Committee
1981	Member, Senior Vice Chancellor Assessment Committee
1983	Chairman, Faculty Affairs Committee, Faculty Senate
1983	Chairman, Faculty Club Committee
1984	Vice-Chairman, Faculty Senate
1984-1986	Member, President's Advisory Committee
1984-1985	Member, Provost Search Committee
1985	President-Elect, Faculty Senate
1986	President, Faculty Senate

1986	Member, President's Financial Review Committee
1986	Chair, Chancellor's Advisory Committee
1987	Chair, Committee on Committees
1988-89	Member, University Club Board of Directors
1988-91	Member, University Budget Council
1988-89	Chair, University Budget Council
1989-90	Member, Search Committee, Dean-Natural Sciences and Mathematics
1989-90	Member, President Search Committee
1991-93	Member, University Budget Council
1989-92	Member, University Club Board of Directors
1992-93	NSM Dean's Distinguished Chairs Committee
1995	Faculty Senate Past Presidents Advisory Committee
1997	Faculty Senate Budget Committee
1997	Chair, Search Committee, Senior Vice Chancellor for Academic Affairs and Senior Vice President for Academic Affairs
1998	Faculty Senate Faculty Affairs Committee
1999	Faculty Senate Faculty Affairs COmmittee
2000	Faculty Senate Faculty Affairs Committee
2001	Faculty Senate Faculty Affairs Committee
2002	Faculty Senate Committee on Commitees
2003	Faculty Senate Budget Committee
2003	Member, President Search Committee
2003	Member, Houston Teacher's Institute
2004	Faculty Senate Scholarship and Community Committee
2005	Faculty Senate Scholarship and Community Committee
2005	Chair, Provost search Committee
2005, 2006, 2007, 2008	Houston Teacher's Institute Advisory Board
2006	Faculty Senate Scholarship and Community Committee

2006	Member, UH Alumnai College
2007	Faculty Senate Ad-Hoc University Planning Committee
2007	Faculty Senate Ad-Hoc University Planning Committee
2008	Member Leadership Council, UH Strategic Energy Alliance
2008	Chair, CLASS Dean's Review Committee
2009	Member, Senate Scholoarchip and Community Committee
2010	Organizer, Faculty Senate Energy Symposium
2011	Member, Faculty Senate Scholarship and Community Committee
2012	Organizer, UH Energy participation in Energy Day 2011
2012	Organizer, UH Energy participation in Earth Day 2012
2012	Organizer, UH Energy participation in Energy Day 2012
2013	Member, Faculty Senate Budget Commmittee
2013	Organizer, UH Energy participation in Earth Day 2013
2013	Organizer, UH Energy participation in Energy Day 2013

STUDENTS

M.S. Degree	**Year**
Richard Alsenz	1976
Charles Doland	1977
Toshiro Matsuyama	1978
Debra Bacon	1981
Abed Mesarwi	1983
Jay Resh	1989
Marc Bronzetti	1990
Gert Rau	1990
A.-H. Bensaoula	1991
Q. L. Charlie Li	1994
X. Y. Louie Li	1994

Scott Endicter	1998
Anges Tempes	1998
Jeff Uhm	2001
Richard Bolduc	2004

Ph.D. Degree

Patrick O'Neill	1977
Gerald Zajac	1981
Ali Zomorrodian	1983
A. Bensaoula	1986
Emanuel Ekwelundu	1988
W.C. Fan	1988
Abed Mesarwi	1989
A. Moshfegh	1990
Jay Resh	1993
Ruth Zhang	1994
Abdelhakim Bensaoula	1995
Waltrud Taferner	1998
Qun Zhong	1996
Esther Kim	1998
Inna Serdiukova	1998
Dwight Ritums	1998
Xin Chen	2000
Agnes Tempes	2001
Yanqi Wang	2002
Angela Carreno Diaz	2004
Christina Papagianni	2005
Yibo Nian	2006
Yang Song	2008

Zongwen Xing	2008
Kristina Young-Fisher	2010
Rabi Ebrahim	2011
Daniel Fisher	2012

POST DOCTORALS AND VISITORS

B. S. Lee Associate Professor, Department of Electrical Engineering
1975-1977 Rutgers University, Princeton, NJ

M. Passler Assistant Professor, Department of Physics
1978-1981 Colorado School of Mines, Golden, CO

D. Adams Physics Institute,1978
Aarhus University, Aarhus, Denmark

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1978-1979 Odense University
1981-1982 Odense, Denmark
1989

M. Van Hove Department of Chemistry
1978 Univ. of California, Berkeley, CA

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N. J. Wu Institute of Physics
1980-1982 Academy of Science
1984 China
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1981-1982 Kabardino-Balkaviar, State Univ., USSR

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1981-1982 Pusan Univ., Pusan, South Korea

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1982-1983 Ben Gurion Univ., Beer Sheva, Israel

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1984 India Institute of Science, India

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1986-88

A. Zomorrodian Dept. of Physics
1984 Ferdowsi University, Mashhad, Iran
1989
1994-95 (sabbatical)
1999-present

T. Pavlovic Scientist,
1984-1985 Univ. of Nic, Yugoslavia

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1985 Jodhpur, India

J. Strozier Associate Professor, Empire College
1985-1986 Stony Brook, NY
1988
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1994-95 (sabbatical)
1995
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2006

E. Grossman Department of Materials Engineering
1986-1987 Ben gurion Univ., Beer Sheva, Israel

Y. Sun Materials Analysis Lab
1986-1987 Central Radio & T.V. Univ., Beijing, China

J. Ocampo Department of Physics
1986-1987 National Autonomas University of Mexico, Temixco, Mexico

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1988-90 Case Western Research University, Cleveland, OH

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1989 University of Florida, Gainesville, FL
H. Hansen Physics Institute

1989 Odense University, Odense, Denmark

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1988 Indiana University of Penn., Indiana, PA

A. Barski Riber Inst.
1988 Paris, France
1989

W. Chen Electro-Optek Corp.
1988 Los Angeles, CA

W. Tsang AT&T Bell Labs
1989 Murray Hill, NJ

S. Y. Tong University of Wisconsin
1990 Milwaukee, WIS
1992
1993

Derrick Chen , University of Houston
1990-1992

Charles Horton, Case Western University
1991

H. Lin, Rice University
1993-1995

K. Xie, Beijing University
1993-94

D. Liu, Fudan University, Shanghia, China
1994-1995

Y. S. Chen, Chinese Academy of Sciences, Beijing, China
1996
1997
1998

Y.M. Chen, Chinese Academy of Sciences
1996-2001

W. W. Zhang, University of Houston
1997-1999

Yuqing Xu, Clemson University
1997-2000

S. Q. Liu, Chinese Academy of Sciences
1997-2003

J. M. Zheng, Beijing University
2000-present

Alexander Molodyk, University of Moscow

2002- 2004

Dalber Sanchez, Universtiy of Peru
2004-2006

Manuel Morales, University of Mexico
2005-2006

Xin Chen, Univestiy of Houston
2003-2007

Zigui Lu, Middle Tennesee University
2006-2008

Rabi Ebrahim, Universtiy of Houston
2011-2012

GRANTS AND CONTRACTS

1. The Research Corporation, (1974), "Investigation of the Initiation of Martensitic-Type Phase Transformations at Surfaces by Low-Energy Electron Diffraction," $7,243.

2. National Science Foundation (1975), "Investigation of the Initiation of Solid-State Structural Phase Transformations at Crystal Surfaces by Low-Energy Electron-Diffraction," $14,655.

3. U.S. Army Research Office (1975-78), "Investigation of the Initiation of Solid State Structural Phase Transformations at Crystal Surfaces by Low-Energy Electron-Diffraction," $100,925.

4. R.A. Welch Foundation (1975-78), "Chemical Interaction of Adsorbed Molecular Species with Metal Surfaces," $54,000.

5. Petroleum Research Fund (1977-78), "Surface Atomic Structure of Metal Substrate-Adsorbate Systems," $24,000.

6. U. of H. Energy Institute (1976-77), "Interaction of Ion Beams with Surfaces," $29,000.

7. Solar Energy Laboratory (1975-77), "Investigation of a High-Temperature Solar Adsorber," $28,626.

8. Energy Research and Development Administration (1977-78), "Surface Morphologies of Efficient Solar Energy Absorbing Materials," $72,362.

9. Department of Energy (1978-79), "Surface Morphologies of Efficient Solar Energy Absorbing Materials," $87,000.

10. R.A. Welch Foundation (1979-82), "Chemical Interaction of Adsorbed Molecular Species with Metal Surfaces," $72,500.

11. Solar Thermal Users Group (1979-1981), "High Flux Degradation Tests at White Sands Solar Furnace," $22,500.

12. Energy Foundation of Texas (1980), "High Flux Solar Simulator Research," $10,000.

13. Department of Energy (1979-80), "Solar Radiation Dependent Degradation of Solar Energy Related Materials," $102,000.

14. Petroleum Research Fund (1980-82), "Surface Atomic Structure of Metal-Adsorbate System," $30,000.

15. Energy Laboratory (1980-81), "Solar Dish Operation Support," $21,500.

16. Department of Energy (1980-81), "Solar Radiation Dependent Degradation of Solar Absorbers," $120,000.

17. International Research and Exchange Board (1981), "Stipend Grant for Russian Scholar," $6,450.

18. Department of Energy (1981-83), "Solar Energy Radiation Dependent Degradation of Solar Energy Related Materials," $148,800.

19. R.A. Welch Foundation (1983-86), "Chemical Interaction of Adsorbed Atomic and Molecular Species with Metal Surfaces," $67,500.

20. Department of Energy (1984), "Solar Energy Radiation Dependent Degradation of Materials," $96,000.

21. International Business Machines (1985), "Postdoctoral Support for Research in Surface Physics," $24,000.

22. University of Houston/Energy Lab (1984-86), "Support for Initiation of the Magnetic Information Research Laboratory," (with C.W. Chu) $223,000.

23. Department of Energy (1985), "Solar Radiation Dependent Degradation of Solar Energy Related Materials," $120,000.

24. Council International Exchange of Scholars (1985), "Development of Selective Surfaces by Vacuum Deposition," $12,700.

25. Department of Energy (1985), "High Flux Photo-Enhancement of Catalytic Processes," $60,000.

26. Department of Energy (1986), "High Flux Degradation Effects in Materials," $80,000.

27. Department of Energy (1986), "Photo-Enhanced Catalysis," $90,000.

28. Control Data Corp. (1986), "Magnetic Materials Research," $50,000.

29. NASA (1986-1990), "Space Vacuum Epitaxy Center," (with C.W. Chu) $5,500,000.00.

30. SVEC Consortium, FY-87 (together with C.W. Chu) $1,080,000.

31. SVEC Consortium Support, FY-87 (together with C. W. Chu) $1,724,760.

32. Department of Energy (1987) $90,000.

33. Department of Energy (1987) $90,000.

34. NASA (1987) $10,000.

35. R. A. Welch Foundation (1987-90) $75,000.

36. NASA SVEC (1988) $1,374,000.

37. SVEC Consortium Support (1988) $660,000.

38. Texas Center for Superconductivity (1988) $526,000.

39. NASA SVEC (1989) $1,376,000.

40. NASA SVEC WSF (FY-90) $1,050,000.

41. Texas Center for Superconductivity (FY-90) $150,000.

42. R.A. Welch Foundation (1990-1993) $90,000.

43. NASA-SVEC support (FY-91) $1,415,000.

44. Texas Center for Superconductivity (FY-91) $240,000.

45. NASA-WSF Support (FY-91) $3,335,000.

46. NASA-SVEC support (FY-92) $1,000,000.

47. NASA-WSF Support (FY-92) $4,115,000.

48. NSF (1991-1992) REU $114,000.

49. NASA-SVEC support (FY-93) $1,000,000.

50. NASA-WSF support (FY93) $4,565,000.

51. NASA Comet program support (FY-93) $150,000.

52. NASA Research support (FY93) $ 141,500.

53. TcSUH Support (FY93) $ 358,412.

54. SVEC State Line Item (FY93) $ 350,000.

55. Texas Space Grant Consortium (FY93) $ 50,000.

56. SVEC Consortium Member Support (FY93) $ 765,600.

57. NASA-SVEC support (FY94) $ 900,000.

58. NASA-WSF support (FY94) $ 3,900,000.

59. Univ of Tennessee Research Support (FY94) $ 80,100.

60. R.A. Welch Foundation (1994-1996) $102,000.

61. TcSUH Research Support (FY94) $ 290,000.

62. SVEC State Line Item Support (FY94) $ 350,000.

63. SVEC Consortium Support (FY94) $ 619,600.

64. NASA-SVEC support (FY95) $ 880,000.

65.	NASA-WSF support (FY95)	$ 3,973,100.
66.	NASA-JSC support (FY95)	$ 100,000.
67.	TcSUH Research Support (FY95)	$ 422,822.
68.	SVEC Consortium Support (FY95)	$ 700,000.
69.	Texas Space Grant Consortium (FY-95)	$ 95,800
70.	Honeywell Space Systems (FY-95)	$ 80,250
71.	SVEC Consortium Support (FY-96)	$ 650,000
72.	NASA SVEC Support (FY-96)	$5,995,000
73.	NASA JSC Lunar Solar Cells (FY-96)	$57,600
74.	TcSUH Research Support (FY-96)	$337,000
75.	SVEC State Line Item Support (FY-96)	$ 488,492
76.	Shell Interdisciplinary Scholar Grant (FY-96)	$100,000
77.	Texas Instruments (FY-96)	$10,000
78	NASA SVEC Support (FY-97)	$3,500,000
79	SVEC State Line Item Support (FY-97)	$488,492
80.	Electric Power Research Institute (FY-97)	$ 100,000
81.	Shell Interdisciplinary Scholar Grant (FY-97)	$100,000
82.	TcSUH Research Support (FY-97)	$ 316,000
83.	NASA SVEC Support (FY-98)	$1,000,000
84.	TcSUH Research Support (FY-98)	$ 290,000
85.	SVEC Special Item Funding (FY-98)	$ 485,000
86.	NASA SVEC Support (FY-99)	$1,000,000
87.	TcSUH Research Support (FY-99)	$ 280,000
88.	Department of Energy (FY-99)	$158,000
89.	Welch Foundation (FY-99 – 02)	$135,000
90.	Texas ARP (FY-98-99)	$165,000
91.	SVEC Special Item Funding (FY-99)	$ 485,000
92.	Deaprtment of Energy (FY-00)	$186,000

93.	NASA SVEC support (FY-00)	$1,000,000
94.	TcSUH Research Support (FY-00)	$250,000
95.	Texas ATP (FY-99-00)	$120,000
96.	NASA Institute for Adv Concepts (FY-00)	$ 74,000
97.	SVEC Industry Collaborations (FY-00)	$ 336,000
98.	NASA SVEC support (FY-01)	$1,000,000
99.	Deaprtment of Energy (FY-01)	$213,000
100.	TcSUH Research Support (FY-01)	$240,000
101.	NASA CETDP (FY-01)	$367,000
102.	Sharp Laboratories (FY-01)	$75,000
103.	SVEC Induatry Collaboriation (FY-01)	$286,000
104.	State of Texas Special Item (FY-01)	$ 485,000
105.	NASA CETDP (FY-02)	$367,000
106.	Texas TD&T (FY-02/03)	$394,000
107.	NASA SVEC Support (FY-02)	$1,000,000
108.	TcSUH (FY-02)	$200,000
109.	Sharp Laboratories (FY-01/02)	$275,000
110.	Sharp Laboratories (FY-03)	$255,000
111.	Metal Oxide Techologioes (FY-02/03)	$462,000
112.	R.A. Welch Foundation (FY-03/05)	$150,000
113.	NASA TcSAM Support (FY-03)	$1,000,000
114.	COVA Technologies (FY-03)	$23,100
115.	TcSAM (FY-03)	$200,000
116.	NASA TcSAM Support (FY-04)	$950,000
117.	Department of Energy (FY-04/06)	$225,000
118.	Sharp Laboratories (FY-04)	$200,000
119.	Metal Oxide Technologies (FY-04)	$135,000
120.	Virtual Vision (FY-04/05)	$400,000

121.	NASA TcSAM Support (FY-05)	$750,000
122.	Welch Foundation (FY-05/07)	$180,000
123.	Sharp Laboratories (FY-05)	$200,000
124.	Texas Center for Superconductivity(FY-06)	$70,000
125.	Quarius Technologies, Inc. (FY-06)	$500,000
126.	Sharp Laboratories (FY-06)	$200,000
127.	Sharp Laboratories (FY-07)	$200,000
128.	Texas Center for Superconductivity (FY-07)	$40,000
129.	Welch Foundation (FY-08-11)	$150,000
130.	Sharp Laboratories (FY-08)	$200,000
131.	NASA (FY-08-12)	$408,000
132.	Seiconductor Research Corp (FY-09-10)	$200,000
133.	Sharp Laboratories (FY-09)	$200,000
134.	Sharp Corporation (FY-10)	$200,000
135.	Unity Semiconductor (FY-10)	$50,000
136.	Sharp Coproration (FY-11)	$200,000
137.	Unity Semiconductor (FY-11)	$50,000
138.	Sharp Corporatoin (FY-12)	$200,000
139.	NASA (FY-13-14)	$500,000