

CURRICULUM VITAE

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EDUCATION

<i>Year</i>	<i>Degree & Field of Study</i>	<i>Institution</i>
1984	D.D.S.	Dental School, National and Kapodistrian University of Athens, Greece
1989	Ph.D. Oral Biology	Ludwig-Maximillian University of Munich, Germany
1992	M.Sc. Experimental Oral Pathology	Eastman Dental Institute, University of London, UK

CLINICAL TRAINING

<i>Year</i>	<i>Title</i>	<i>Institution</i>
1985-86	Clinical Fellow in Oral Medicine	University Clinic of Oral & Maxillofacial Surgery, Ludwig-Maximillian University of Munich, Germany
1989-91	Clinical Fellow in Oral Medicine	Clinic of Oral Medicine, 251 General Airforce Hospital, Athens, Greece

POSTDOCTORAL TRAINING

<i>Year</i>	<i>Discipline</i>	<i>Institution</i>
1992-94	Photomedicine	Department of Oral Pathology, Eastman Dental Institute, London, U.K. (advisor: Dr. Paul Speight)
1995-97	Photomedicine	Wellman Laboratories of Photomedicine, Department of Dermatology, Massachusetts General Hospital, Harvard Medical School. (advisor: Dr. Tayyaba Hasan)

FACULTY ACADEMIC APPOINTMENTS

1998-2012	Instructor in Dermatology, Wellman Center of Photomedicine, Department of Dermatology, Massachusetts General Hospital, Harvard Medical School
2002-2015	Founding Director, <i>Applied Molecular Photomedicine</i> Laboratory, The Forsyth Institute
2002-2008	Assistant Member of the Staff (equivalent to Assistant Professor), The Forsyth Institute

2008-2014	Associate Member of the Staff (equivalent to Associate Professor), The Forsyth Institute
2014-2015	Senior Research Investigator (equivalent to Professor), The Forsyth Institute
2015	Assistant Teaching Professor, Department of Physics & Biology, College of Science Northeastern University

APPOINTMENTS AT HOSPITALS/AFFILIATED INSTITUTIONS

1998-2012	Assistant in Oral Pathology, Massachusetts General Hospital
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OTHER PROFESSIONAL POSITIONS

2011-	Scientific Founder and Chief Science Officer, PhotOral, Inc., Lexington, MA
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COMMITTEE SERVICE

2002	Oral Biology and Medicine SBIR/STTR Special Emphasis Panel, National Institutes of Health
2004, 2008	Thesis Committee (D.M.Sc.), Harvard University
2004	Skeletal Biology Structure & Regeneration Study Section, National Institutes of Health
2009-2012	Research Oversight Committee, Forsyth Institute
2011 & 2012	Head of the Scientific Retreat Committee, Forsyth Institute

PROFESSIONAL SOCIETIES

International Association for Dental Research

American Association for Dental Research

World Future Society

EDITORIAL ACTIVITIES

Reviewer (ad hoc) of 15-20 manuscripts per year for the following journals:

Photochemistry & Photobiology

Journal of Photochemistry and Photobiology: Biology

Lasers in Surgery and Medicine

Journal of Medical Microbiology

Journal of Periodontology

European Journal of Oral Sciences

Antimicrobial Agents & Chemotherapy

Journal of Biomedical Optics

Biofilms

Journal of Periodontal Research

Journal of Endodontics

Journal of Clinical Periodontology

Photomedicine and Laser Surgery

Journal of Applied Oral Science

Caries Research

Journal of Biomedicine and Biotechnology

Lasers in Medical Science

Archives of Oral Biology

Journal of Dentistry & Oral Hygiene

Atherosclerosis

HONORS AND PRIZES

1985-	Greek scholar for Ph.D. studies in Germany
1996-1997	Fellow of the MGH Laser Center
1997-1998	Fellow of the MGH Laser Center
1998-1999	Fellow of the Boston Oral Health Clinical Resource Center
2001-2002	Culpeper Biomedical Pilot Initiative Award, Rockefeller Brothers Fund
2002-2012	Affiliated Scientist, Wellman Center for Photomedicine, Massachusetts General Hospital
2003	Excellence in Teaching Award, Harvard Medical School & Harvard School of Dental Medicine
2007-2014	Adjunct Assistant Professor Bouvé College of Health Sciences, Northeastern University, Boston
2003-	Part-time lecturer Department of Physics, College of Science, Northeastern University
2011-present	Director of the undergraduate course " <i>Medical Physics Seminar</i> ", Department of Physics, College of Science, Northeastern University
2011	Scientific Founder, PhotOral Inc.
2012	PhotOral/Mass Innovation Nights (first place)
2012	PhotOral/Mass Challenge Accelerator Finalist (125 finalists out of 1275 companies)

- 2013 Execution of a License Agreement with Sunstar for the development of intra-oral blue light technology
- 2015 Director of the undergraduate course "*Introduction to Science*", Department of Physics, College of Science, Northeastern University

REPORT OF FUNDED AND UNFUNDED PROJECTS

Funding Information

- 1995-1996 Principal Investigator
Milton Fund Award
Laser-induced fluorescence of oral cancer and precancer
- 1996-1997 Principal Investigator
MGH Laser Center Fellowship, Department of Energy
Epidermal growth factor receptor targeted immunophotodiagnosis of oral cancer and precancer
- 1997-1998 Principal Investigator
MGH Laser Center Fellowship, Department of Energy
Epidermal growth factor as a target for photoimmunotherapy and immunophotodiagnosis of oral cancer
- 1996-1998 Co-Investigator with a significant input (PI: T. Hasan)
Periodontix Inc.
Photodynamic therapy of periodontitis
- 1998-1999 Principal Investigator
Boston Oral Health Clinical Resource Center Award
Targeted photoinactivation of periodontal pathogens
- 1998-1999 Co-Investigator (PI: A. Doukas)
Department of Defence Medical Free Electron Laser Program
Identification of biological effects of high peak power, short pulse lasers on microbial biofilms
- 1998-2000 Principal Investigator
Personal gift from the Department of Otolaryngology/Head and Neck Surgery, Massachusetts Eye and Ear Infirmary, Harvard Medical School Research on Microbial Biofilms

- 1999-2000 Co-Investigator with a significant input (PI: A. Doukas)
Neutrogena Corp.
Fluorescence Excitation Spectroscopy and Epidermal Proliferation
- 2000-2001 Wellman Laboratories of Photomedicine,
Department of Dermatology (PI: JA Parrish)
- 2001-2002 Principal Investigator
Rockefeller Brothers Fund
Photodestruction of bacteria in natural dental plaque
- 2002-2003 Co-Investigator (PI: J. Max Goodson)
BriteSmiles Corp.
Gingival health changes associated with BriteSmile Light
- 2003-2004 Principal Investigator
BriteSmiles Corp.
Selective targeting of bacteria in human dental plaque by visible light
- 2002-2005 Principal Investigator
R01-DE-14360 NIH:NIDCR
Photosensitization of oral bacteria
- 2005 Principal Investigator
Effect of antibiotics on oral biofilms
Johnson & Johnson/OraPharma Inc.
- 2006-2007 Principal Investigator
Light susceptibility of oral bacteria - An *in vitro* study
Colgate Inc.
- 2006-2007 Co-Investigator (PI: JM Goodson)
Effects of intraoral blue light on halitosis
Colgate Inc.
- 2007-2008 Principal Investigator
Phototargeting periodontal inflammation (Part I)
Colgate Inc.
- 2006-2010 Principal Investigator
R01-DE-016922 NIH;NIDCR
Photodynamic therapy for endodontic disinfection
- 2008 Principal Investigator
Phototargeting periodontal inflammation (Part II)
Colgate Inc.

- 2008 Co-Investigator (PI: JM Goodson)
Phototherapy of gingivitis – A clinical study
Colgate Inc.
- 2009-2011 Principal Investigator
R21-DE-018782 NIH:NIDCR
Nanoparticle-based antimicrobial photochemotherapy in
biofilms
- 2008-2012 Co-Investigator (PI: T Kawai)
R01-DE-018499-01 NIH:NIDCR
T-Regulatory cells in periodontal disease
- 2011-2012 Principal Investigator
Clinical evaluation of phototherapeutic products to control
plaque and gingivitis – A clinical trial
Colgate Inc.
- 2011-2012 Principal Investigator
Antimicrobial action of arestin and infrared light on oral
multi-species biofilms: a comparative study
OraPharma Inc.
- 2013-2014 Co- Investigator (PI: Nicusor Iftimia, Physical Sciences, Inc.)
1R43DE023714-01 NIH:NIDCR
Raman/OCT probe for real-time assessment of oral health
- 2013-2014 Principal Investigator
The Impact of Blue Light on Oral Biofilm Growth
PhotOral, Inc.

REPORT OF LOCAL TEACHING AND TRAINING

Formal Teaching

- 1995-2002 Delivered tutorial lectures in the Wellman
Laboratories Photomedicine Lecture Series
(2-3 lectures of 30 min each/year)
- 1996-1998 Delivered tutorial lectures in the MGH Laser
Center
(3 lectures of 30 min each/year)
- 2001-2005 Tutor, Harvard School of Dental Medicine,
Boston
Development course (8-9 dental students, 9
weeks, 2 hours/week)

2002-2010	Tutor, Harvard School of Dental Medicine, Boston <u>Oral Microbiology & Immunology course</u> (8-9 dental students, 4 weeks, 2 hours/week)
2003, 2005, 2007, 2009	Lecturer, Northeastern University, Boston <u>Biomedical Physics course</u> (4-6 students, 2-4 seminars, 3 hours/seminar)
2011, 2013, 2015	Director of the <u>Medical Physics Seminar course</u> , Northeastern University, Boston (6 students, delivered 11 seminars, 3 hours/seminar)
2015	Director of the undergraduate course " <i>Introduction to Science</i> ", Department of Physics, College of Science, Northeastern University, Boston (37 undergraduate students, delivered 35 lectures - 1h per seminar and organized a student symposium)

Advisory Teaching

1993-1994	One Ph.D. student (Advisor in the lab - Oral Biology)
1994-1995	One undergraduate student (Advisor in the lab - Oral Biology)
1999-2000	One undergraduate MIT student (Advisor on a project - Photomedicine)
1997-2001	One medical student (Advisor on different projects - Photomedicine)

Formal Supervised Trainees and Faculty

Post-doctoral Research Fellows

2009-2011	Vanja Klepac-Ceraj, PhD
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2007-2008	Yan Hu, MD
2005-2007	Carla Fontana, DDS, PhD
2006-2007	Federico Foschi, DDS, PhD
2004-2005	Makoto Ogura, PhD

Research Associates

2007-2014	Xiaoqing (Lucy) Song, MD, MS
2013-2014	Tina Yaskell, BS
2003-2007	Karriann Ruggiero, BS
2003-2004	Abraham Abernethy, BS
2002-2004	Sovanda Som, BS, MSc

Research Assistants

2013-2014	Angeliki Polymeri, DDS, MS
2010-2011	Nguyen Nguyen, BS
2009-2011	Niraj Patel, BS, MSc
2008-2009	Despina Papamanou, DDS
2006-2008	Joshua Dunham, BS
2004-2006	Stephanie Doucette, BS
2004	Philip Kyriakakis, BS

Graduate Students

2008-2010	Fiza Singh, DDS (MMSc student in Endodontics, Harvard School of Dental Medicine)
2008-2010	Raymond Ng, DDS (MMSc student in Endodontics, Harvard School of Dental Medicine)

2006-2009	Mark Young, DDS (MMSc student in Endodontics, Harvard School of Dental Medicine)
2006-2009	Judy Chen, DDS (MMSc student in Endodontics, Harvard School of Dental Medicine)
2006-2009	Helen Youm, DDS (MMSc student in Endodontics, Harvard School of Dental Medicine)
2006-2008	Jacob Fimple (MMSc student in Endodontics, Harvard School of Dental Medicine)
2005-2007	Reza Riahi, DDS (MMSc student in Endodontics, Harvard School of Dental Medicine)
2005-2007	Tony Vera, DDS (MMSc student in Endodontics, Harvard School of Dental Medicine)
2005	Vinicius Rengal Geraldo-Martins, DDS (Brazilian Scholar)
2004-2005	Jason Morris, DDS (MMSc student in Endodontics, Harvard School of Dental Medicine)
2003-2004	Peter Chen, DDS (MMSc student in Endodontics, Harvard School of Dental Medicine)

Dental Students

2007	Sean Connolly (Dental student, Arizona)
2003-2006	Ryan Blissett (Dental student, Harvard School of Dental Medicine)

Undergraduate Students

2008-2010	Chitrang Patel (Biology sophomore, Northeastern University, Boston)
2008	Lawrence Yu (Biomedical Engineering sophomore, Boston University)

High School Students

2011	Monica Kumar
2009	Alexander Sutula
2007	Sarah Kumar
2003	Jonathan Fine

REPORT OF REGIONAL, NATIONAL AND INTERNATIONAL INVITED TEACHING AND PRESENTATIONS

1997	<i>Light in Oral Research</i> Forsyth Dental Center, Boston
1999	<i>Oral Photomedicine</i> Harvard School of Dental Medicine, Boston
2000	<i>The "Oral Photomedicine" Research Program</i> Center for Innovative Minimally Invasive Techniques, Boston
2001	<i>Photochemical targeting of early cancer and bacterial infections in the oral cavity</i> Center for Engineering in Medicine, Boston
2002	<i>Molecular Photomedicine</i> Symposium of the Greek Research Institutes, Ioannina, Greece
2004	<i>Applied Molecular Photomedicine: A vision of Oral Health Care</i> Johnson & Johnson, Inc., New Jersey
2004	<i>Diode Lasers in Experimental Oral Pathology</i> Diode Laser Technology Workshop, Sponsored by the American Society for Laser Medicine and Surgery, Dallas
2004	<i>Light-mouth interaction</i> Johnson & Johnson, Inc., New Jersey
2004	<i>Targeted antimicrobial phototherapy</i> Gillette Oral Care, Boston

- 2004 *Photomedicine – A vision of oral health care*
Colgate, Inc., New Jersey
- 2005 *Targeted antimicrobial phototherapy*
Colgate, Inc., New Jersey
- 2006 *Targeting oral infection by phototherapy*
Mount Ida College, Newton, MA
- 2006 *Unique potentials of light-activated control of oral pathogens*
IADR PEF Conference, Dublin, Ireland
- 2006 *Towards the Nano-Photo-Medicine Initiative for oral disease management*
Integrative Graduate Education and Research Training (IGERT) Nanomedicine Distinguished Lecture, Northeastern University, Boston
- 2007 *Nanoparticle-based antimicrobial photochemotherapy*
Integrative Graduate Education and Research Training (IGERT) Nanomedicine Distinguished Lecture, Northeastern University, Boston
- 2008 *Photobiology and Nanotechnology in the service of Stomatology*
Symposium of Oral Medicine, Developments and Perspectives – Diagnosis, Treatment, Research, Athens, Greece
- 2009 *Choosing a career path in the dental field - Tips and Advice*
Invited by Northeastern University students
- 2010 *Oral Nano-Photo-Medicine Initiative*
Mount Ida College, Newton, MA
- 2010 *Phototargeting endodontic infection*
Annual Meeting of the American Association of Endodontists, San Diego, CA
- 2010 *Translating cross-disciplinary ideas*
Mount Ida College, Newton, MA
- 2011 *Nanoparticle-based antimicrobial photochemotherapy*
Harvard-Forsyth-Tohoku Research Workshop, Boston

- 2012 *The Science of PhotOral's Blue Light*
Sunstar Suisse, Lausanne, Switzerland
- 2013 *Visible light and Oral Homeostasis – A journey from basic to applied research*
Annual Meeting of the American Society for Lasers in Surgery and Medicine, Boston, MA
- 2013 *The story of the Intraoral Blue Light Technology: A paradigm shift*
Sunstar Americas, Chicago
- 2013 *Dental plaque: Current opinion on diagnostic and therapeutic strategies*
Physical Sciences, Andover, MA
- 2014 *Balancing between Oral and Risk Homeostasis*
Tufts University School of Dental Medicine, Boston
- 2014 *Quo vadis root canal disinfection?*
Annual Meeting of the American Association of Endodontists, Washington D.C., MD
- 2014 Endodontic Microbiology and Novel Treatment Modalities
Goldman School of Dental Medicine, Boston University
- 2015 *A 25-year journey in Oral PhotoMedicine*
Tufts University School of Dental Medicine, Boston
- 2011- ~300 lectures, seminars and presentations as Chief Science Officer of PhotOral, Inc.

Report of Technological and other Scientific Innovations

Patents

- Hasan T, Hamblin MR, **Soukos NS**, inventors; Photosensitizer conjugates for pathogen targeting.
US patent #7,268,155, September 11, 2007.

- **Soukos NS**, Lee S, Doukas AG. Inventors; Permeabilizing biofilms. US patent #7,332,200, February 19, 2008.

- Goodson JM and **Soukos NS**, inventors; Intraoral light-emitting device. US patent #8,021,148 B2, September 20 2011.

Patent applications

- **Soukos NS**, Stashenko PP, inventors; A handheld device for delivering photodynamic therapy. March 2013.

Report of Scholarship

Peer Reviewed Publications in print or other media

- **Soukos NS**, Grant WE, Speight PM (1994). Photodynamic effects of di-sulphonated aluminium phthalocyanine on human epidermal keratinocytes *in vitro*. *Lasers Med Sc*, 9: 183-90.

- **Soukos NS**, Wilson M, Burns T, Speight PM (1996). Photodynamic effects of toluidine blue on human oral keratinocytes and fibroblasts and *Streptococcus sanguis* evaluated *in vitro*. *Lasers Surg Med*, 18(3): 253-259.

- **Soukos NS**, Hamblin MR, Hasan T (1997). The effect of charge on cellular uptake and phototoxicity of polylysine chlorin e6 conjugates. *Photochem Photobiol*, 65(4): 723-729.

- **Soukos NS**, Himenez LA, Hamblin MR, Socransky SS, Hasan T (1998). Targeted antimicrobial photochemotherapy. *Antimicrob Agents Chemother*, 42 (10): 2595-2601.

- Hamblin MR, Rajadhyaksha M, Momma T, **Soukos NS**, Hasan T (1999). *In vivo* fluorescence imaging of the transport of charged chlorin e6 conjugates in a rat orthotopic prostate tumor. *Br J Cancer*, 81 (2): 261-268.

- **Soukos NS**, Socransky SS, Mulholland SE, Lee S, Doukas AG (2000). Photomechanical drug delivery into bacterial biofilms. *Pharmaceutical Res*, 17 (4): 405-407.
- **Soukos NS**, Crowley K, Bamberg MP, Gillies R, Doukas AG, Evans R, Kollias NA (2000). A rapid method to detect dried saliva stains swabbed from human skin using fluorescence spectroscopy. *Forensic Sci Int*, 114: 133-138.
- Doukas AG, **Soukos NS**, Ball S, Appa Y, Kollias N (2001). Fluorescence excitation spectroscopy for the measurement of epidermal proliferation. *Photochem Photobiol*, 74(1): 96-102.
- **Soukos NS**, Hamblin MR, Keel S, Fabian R, Hasan T (2001). Epidermal growth factor receptor as a target for immunophotodiagnosis and photoimmunotherapy of oral precancer. *Cancer Res*, 61: 4490-4496.
- **Soukos NS**, Mulholland SE, Socransky SS, Doukas AG (2003). Photodestruction of human dental plaque bacteria. Enhancement of the photodynamic effect by photomechanical waves in an oral biofilm model. *Lasers Surg Med*, 33: 161-168.
- **Soukos NS**, Som S, Abernethy A, Ruggiero K, Dunham J, Lee C, Doukas AG, Goodson JM (2005). Phototargeting oral black-pigmented bacteria. *Antimicrob Agents Chemother*, 49 (4): 1391-1396.
- **Soukos NS**, Chen PS-Y, Morris JT, Ruggiero K, Abernethy AD, Som S, Foschi F, Doucette S, Luschke Bammann L, Raquel Fontana C, Doukas AG, Stashenko PP (2006). Photodynamic therapy for endodontic disinfection. *J Endod*, 32 (10): 979-984.
- Ogura M., Abernethy AD, Blissett RD, Ruggiero K, Som S, Goodson JM, Kent R, Doukas AG, **Soukos NS** (2007). Photomechanical wave-assisted drug delivery in oral multispecies biofilms. *World J Microbiol Biotechnol*, 23 (11): 1637-1646.
- Foschi F, Fontana CR, Ruggiero K, Riahi R, Vera A, Doukas AG, Pagonis TC, Kent R, Stashenko PP, **Soukos NS** (2007). Photodynamic inactivation of *Enterococcus faecalis* in dental root canals *in vitro*. *Lasers Surg Med*, 39 (10): 782-787.

- Fimple JL, Fontana CR, Foschi F, Ruggiero K, Song X, Pagonis TC, Tanner ACR, Kent R, Doukas AG, Stashenko PP, **Soukos NS** (2008). Photodynamic treatment of endodontic polymicrobial infection *in vitro*. J Endod, 34 (6): 728-734.
- Fontana CR, Abernethy AD, Som S, Ruggiero K, Doucette S, Marcantonio RAC, Boussios CI, Doukas AG, Kent R, Goodson JM, Tanner ACR, **Soukos NS** (2009). The antibacterial effect of photodynamic therapy in dental plaque biofilms. J. Period. Res. 44 (6): 751-759.
- Xu Y, Young MJ, Battaglino R, Morse LR, Fontana CR, Pagonis TC, Kent R, **Soukos NS** (2009). Endodontic antimicrobial photodynamic therapy: Safety assessment in mammalian cell cultures. J. Endod. 35(11):1567-1572.
- Pagonis TC, Chen J, Fontana CR, Devalapally H, Ruggiero K, Song X, Foschi F, Dunham J, Skobe Z, Yamazaki H, Kent R, Tanner ACR, Amiji MM, **Soukos NS** (2010). Nanoparticle-based endodontic antimicrobial photodynamic therapy. J. Endod. 36(2):322-328.
- Ng R, Singh F, Papamanou DA, Song X, Patel C, Holewa C, Patel N, Klepac-Ceraj V, Fontana CR, Kent R, Pagonis TC, Stashenko PP, **Soukos NS** (2011). Endodontic photodynamic therapy *ex vivo*. J. Endod. 37(2):217-222.
- Klepac-Ceraj V, Patel N, Song X, Holewa C, Patel C, Kent R, Amiji MM, **Soukos NS** (2011). Photodynamic effects of methylene blue-loaded polymeric nanoparticles on dental plaque bacteria. Lasers Surg. Med. 43:600-606.
- Fontana CR, Lerman MA, Patel N, Grecco C, de Souza Costa CA, Amiji MM, Bagnato VS, **Soukos NS** (2013). Safety assessment of photodynamic therapy in rats. Lasers Med. Sci. 28(2):479-486.
- Hasturk H, Nguyen DH, Sherzai H, Song X, **Soukos N**, Bidlack FB, Van Dyke TE (2013). Comparison of the impact of scaler material composition on polished titanium implant abutment surfaces. J. Dent. Hyg. 87(4):200-211.
- Song X, Yaskell T, Klepac-Ceraj V, Lynch MC, **Soukos NS** (2014). Antimicrobial Action of Minocycline Microspheres Versus 810 nm Diode Laser on Human Dental Plaque Microcosm Biofilms. J. Periodontol. 85(2):335-342.

- **Soukos NS**, Stultz J, Abernethy AD, Goodson JM (2015). Phototargeting human periodontal pathogens *in vivo*. *Lasers Med. Sci.* 30(3):943-952.
- Fontana CR, Song X, Polymeri A, Goodson JM, Wang X, **Soukos NS**. The effect of blue light on periodontal biofilm growth *in vitro*. *Lasers Med. Sci.* (in print).

Non-peer reviewed scientific or medical publications/materials in print or other media

Proceedings of Meetings

- **Soukos NS**, Hamblin MR, Deutsch TF, Hasan T. Monoclonal antibody-tagged receptor-targeted contrast agents for detection of cancers. *SPIE BIOS Proceedings*, July 2001.

Reviews, chapters, monographs and editorials

- **Soukos NS**, Goodson JM. 2011. Photodynamic therapy in the control of oral biofilms. *Periodontol.* 2000 55(1):143-166.
- **Soukos NS**. Oral Leukoplakia, Idiopathic. In: *e-Medicine Journal (Otolaryngology and Facial Plastic Surgery-Head and Neck Surgery)*. Terris DJ, Talavera F, Sadeghi N, Slack CL, Meyers AD (eds), Vol. 2 (7), 2008.

Thesis

- **Soukos NS**: Autoradiographische *in vitro*-Untersuchungen zum Proliferationsverhalten der menschlichen enoralen Schleimhaut (dissertation, in German). Munich: Ludwig Maximilian University; 1989.
- **Soukos NS**. Photodynamic effects of di-sulphonated aluminium phthalocyanine and 5-aminolevulinic acid on human epidermal keratinocytes *in vitro*. M.Sc. Thesis, University of London, 1992.

Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings

- Hikmat B, **Soukos N**, Osborn J, Prime SS, Speight PM. Alterations in epithelial-fibroblast interactions in malignant and epithelial cells. *J Dent Res*, 74 (3): 842, 1995.
- Mehter Z, Hopps RM, **Soukos N**, Speight PM. The effects of scatter factor on benign and malignant epithelial cells. *J Dent Res*, 75 (5): 1193, 1996.
- Som S, Goodson JM, Abernethy A, Ruggiero K, Dunham J, Skobe Z, Rogers RA, Tegos G, Hamblin MR, Doukas AG, **Soukos N**. Characterization and validation of a dental plaque microcosm laboratory biofilm. *J Dent Res*, 83, 2004.
- Leonel JS, Goodson JM, Groppo F, **Soukos NS**, Stultz J, Som S, Newman MB, Tavares M, Kozlowski VA. Gingival Health Changes Associated with Tooth Whitening. *J Dent Res*, 84, 2005.
- **Soukos NS**, Abernethy A, Ruggiero K, Doukas AG, Goodson JM, Rajadhyaksha M, Eastman JM. Imaging of oral biofilms by confocal reflectance microscopy *in vitro*. *J Dent Res*, 84, 2005.
- Tavares M, Goodson JM, Leonel JS, Stultz J, **Soukos NS**, Newman MB. Placebo Effects and Tooth Whitening Procedures. *J Dent Res*, 84, 2005.
- Doucette S, Ruggiero K, Abernethy A, Lu C, Kanasi E, Tanner A, Lawter JR, Goodson JM, **Soukos NS**. Effects of minocycline on oral multi-species biofilms. *J. Dent. Res.* 85(Spec. Iss. A): Abstr. #1146, 2006.
- Ruggiero K, Doucette S, Abernethy A, Lu C, Kanasi E, Tanner A, Lawter JR, Goodson JM, **Soukos NS**. Susceptibility of oral biofilm bacteria to doxycycline. *J. Dent. Res.* 85(Spec. Iss. A): Abstr. #1147, 2006.
- Geraldo-Martins VR, Nogueira RD, Miyagi S, Marques MM, **Soukos N**. Photodynamic Therapy Effects on Human Oral Fibroblasts and Streptococcus mutans. *J. Dent. Res.* 85(Spec. Iss. A): Abstr. #2097, 2006.
- Ruggiero K, Abernethy A, Doukas AG, Goodson JM, **Soukos NS**. Blue light suppresses black-pigmented bacteria in microcosm biofilms. 85th General

Session & Exhibition of the IADR, New Orleans, Louisiana, March 21-24, 2007.

- Geraldo-Martins VR, Fontana C, Ruggiero K, Marques MM, **Soukos NS**. Effect of light dose on the photodestruction of *Streptococcus mutans*. 85th General Session & Exhibition of the IADR, New Orleans, Louisiana, March 21-24, 2007.

- Song X, Ng RH-B, Singh F, Papamanou DA, Patel CB, Yu LK, Pagonis T, Soukos NS. Microbiota in endodontic infections. 87th General Session & Exhibition of the IADR, Miami, Florida, April 1-4, 2009.

- Papamanou DA, Song X, Youm H, Patel CB, Yu LK, Patel N, Amiji MM, **Soukos NS**. Methylene blue-loaded polymeric nanoparticles: Effect of serum on bacterial photodestruction. 87th General Session & Exhibition of the IADR, Miami, Florida, April 1-4, 2009.

Narrative report (limit to 500 words)

My major research interests are:

1. Antimicrobial photochemotherapy
2. Photodynamic therapy-assisted endodontic disinfection
3. Theranostics Platform for Oral Precancer
4. Nano-Photo-Medicine Targeting Strategies
5. The impact of blue light on dental plaque growth and host innate response dynamics

My research accomplishments are:

1) The development of a new direction in Oral Research by establishing a unique research program in the field of Photomedicine. In 2003, I founded and since then I have directed the Applied Molecular Photomedicine Laboratory (AMPL) at The Forsyth Institute. This is a translational research laboratory - unique of its kind nationwide - with strong collaborations with outstanding clinicians, scientists, and engineers. The vision of AMPL is the development of novel light-guided and light-activated multifunctional systems and smart drugs for early detection, as well as for facilitating targeted drug delivery, effectiveness of therapy, and real-time monitoring of drug action. The use of photodynamic therapy, light alone, antibody-photosensitizer conjugates or non-antibody based

targeting moieties, such as nanoparticles, are examples of targeted therapy explored in AMPL.

2) I am the Scientific Founder and Chief Scientific Officer of PhotOral, Inc. (2011), a science-based company in Boston that has licensed my patented technology from The Forsyth Institute to develop a novel intraoral device that emits light in the blue region of the electromagnetic spectrum in the appropriate wavelength and dosimetry for targeting and killing potentially harmful dental plaque microorganisms.

3) The establishment of the Nano-Photo-Medicine Initiative, whose goal is to bring Photomecicine and Nanotechnology together. Our efforts concern the use of nanoparticles for molecular targeting. Nanoparticles (size < 100 nm) belong to a new class of multifunctional biophotonic systems that will not only serve as high-quality diagnostic fluorescent agents for noninvasive tumor detection, but also as noninvasive malignant and bacterial destruction systems with light-activated properties. Our effort is based on a strong collaboration developed between AMPL and the Nanomedicine Consortium at Northeastern University, Boston.

4) The use of photomechanical waves generated by high pulse lasers to enhance the penetration of drugs into microbial biofilms and the demonstration of the synergistic effect of photomechanical waves and photodynamic therapy for the eradication of oral microbial biofilms *in vitro* (2000).

5) The early detection of oral precancer (invisible to naked eye) in the hamster cheek pouch carcinogenesis model by combining the specificity of a monoclonal antibody conjugated with a fluorescent dye and the sensitivity of optical detection (2001). This study was reviewed by the Translational Center for Biotechnology Information at NIH, recently (2009).

6) The development of photodynamic therapy as an adjunctive technique to standard chemo-mechanical endodontic disinfection (2006). Research performed in our laboratory (the only laboratory devoted to this effort in the U.S.) has contributed to fundamental and technical advances.