

CURRICULUM VITAE

Xiaoyuan (Shawn) Chen



Senior Investigator

Chief, Laboratory of Molecular Imaging and Nanomedicine (LOMIN)
National Institute of Biomedical Imaging and Bioengineering (NIBIB)
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Associate Professor of Radiology (Leaves of Absence)
Department of Radiology, Stanford University School of Medicine
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PERSONAL

Sex: Male
Date of Birth: April 21, 1974
Place of Birth: Jiangsu, China
Married (Michelle Ji), one child (Grace Chen)

EDUCATION

Colleges and Universities Attended:

Nanjing University, Nanjing, China	B.Sc.	1993	Chemistry
Nanjing University, Nanjing, China	M.Sc.	1996	Chemistry
University of Idaho, Moscow, ID	Ph.D.	1999	Chemistry

Scholarships and Honors:

Teaching Assistant	1996-1997
Research Assistant	1997-1999

Postdoctoral and Residency Training

Syracuse University, Syracuse, NY	
Postdoctoral Fellow – Department of Chemistry	1999-2000
Washington University, St. Louis, MO	
Postdoctoral Fellow – Department of Radiology	2000-2001

EMPLOYMENT HISTORY

National Institute of health	
Senior Investigator, Laboratory Chief	08/09-present
Stanford University	

Associate Professor of Radiology Stanford University	09/08-present
Assistant Professor of Radiology University of Southern California	05/04-08/08
Assistant Professor of Radiology Research SynPep, Inc., Dublin, CA	02/02-04/04
Radio-Organic and Peptide Chemist	07/01-01/02

PUBLIC AND PROFESSIONAL SERVICE

Grant Reviewer

NIH NANO study section member
 NIH MEDI A Study Section (Ad hoc)
 NIH SBIR/STTR study section member (NANO, RTB, MEDI)
 NSF China Oversea reviewer
 Department of Defense (BCRP, PCRP)
 A*STAR Biomedical Research Council (BMRC) in Singapore
 Department of Veterans Affairs
 Komen Breast Cancer Foundation
 Kentucky Science and Engineering Foundation
 CUNY Collaborative Incentive Research Grants Program
 Cancer Research UK Science Funding Committee
 Dutch Cancer Society
 The Canada Foundation for Innovation
 Alberta Heritage Foundation for Medical Research (AHFMR)

Scientific Site Review

Science Foundation Ireland (SFI), Jan 2009

Journal Review (over 50):

PhD Thesis Committee Member:

Zhuang Liu, Department of Chemistry, Stanford
 Wei Hu, Materials Science & Engineering, Stanford
 Sung You Hong, Department of Chemistry, Oxford University
 Su-Tang Lo, Department of Radiology, UT Southwestern (co-mentor)

Committee Member:

Stanford Radioactive Drug Research Committee (RDRC)
 Radiology Department Appointment and Promotion (A&P) Committee
 Administrative Panel on Biosafety (APB)
 PET Steering Committee (NIH)

Major Teaching Activities (Stanford):

BioE222
 Pharmacology, radiolabeling, tracers

Biophysics250

Affiliated Departments and Programs:

By Courtesy, Department of Biophysics
Member, Bio-X Program
Member, Molecular Imaging Program at Stanford (MIPS)
Member, Stanford Comprehensive Cancer Center
Guest Professor, The Fourth Military Medical University
Guest Professor, Wuhan Institute of Technology
Guest Professor, Fourth Affiliated Hospital of Harbin Medical University

Editorial Board:

Journal of Nuclear Medicine
European Journal of Nuclear Medicine and Molecular Imaging
Bioconjugate Chemistry (Associate Editor)
Molecular Imaging
Molecular Imaging and Biology
Nanoscale Research Letters (Topical Editor)
Current Molecular Pharmacology
Frontiers in Biosciences
Recent Patents on Anti-Cancer Drug Discovery
The Open Medical Imaging Journal
International Journal of Molecular Imaging

Book Editor:

Recent Advances of Bioconjugate Chemistry in Molecular Imaging (Publisher: Research Signpost)
Nanotechnology-Based Molecular Imaging (Publisher: John Wiley & Sons)
Molecular Imaging Probes for Cancer Research (Publisher: World Scientific Publishing / Imperial College Press)
Integrin Targeted Imaging and Therapy (Publisher: Bentham Science Publishers)

Journal Guest Editor:

European Journal of Nuclear Medicine and Molecular Imaging (Supplement: Imaging Angiogenesis)
Amino Acids (SI: Peptide probes for molecular imaging)
Curr Top Med Chem (SI: The Medicinal Chemistry of Targeted Tumor Imaging)

POST-DEGREE HONORS AND AWARDS

First place award in the Molecular Imaging Abstract track for abstract titled “Trafficking the fate of mesenchymal stem cells in vivo” from the SNM’s Molecular Imaging Center of Excellence (55th SNM annual meeting), 2008
Best Basic Science Award, 55th, 54th, and 53rd SNM annual meetings (2008, 2007, and 2006).
J Nucl Med Best Basic Science paper (2008)
J Nucl Med cover features 2004 (issue #7) and 2006 (issue #1).
Cancer Res cover feature 2008 (issue #16)

Mol Imaging cover feature 2009 (issue #2)	
Pilot Research Award – Department of the Army OCRP	2005-2007
IDEA Award – Department of the Army BCRP	2004-2007
New Investigator Award - Department of the Army PCRCP	2003-2006
Education and Research Foundation – Society of Nuclear Medicine	2003-2004
Concept Award – Department of the Army BCRP	2003-2004
Research Award – American Lung Association of California	2003-2005
Research Award – Robert E. and Mary R. Wright Foundation	2003-2004

SOCIETY MEMBERSHIPS

Society of Nuclear Medicine (SNM)	2000-
American Chemical Society (ACS)	1996-
Royal Society of Chemistry (RSC)	2000-
Society for Molecular Imaging (SMI)	2002-
Academy of Molecular Imaging (AMI)	2003-
American Association for the Advancement of Science (AAAS)	2004-

SCHOLARLY PUBLICATIONS*PEER-REVIEWED ARTICLES (TOTAL OF 179)*Publications from Nanjing University:

1. Chen X, Zhang X, Meng Q, Sweigart, DA.
Kinetic study of nucleophilic substitution reactions of N-methylimidazole with hemin chloride.
Chin J Inorg Chem 1995;11(2):192-7.
2. Zhang S, Chen X, Meng Q, Xie W.
Synthesis, characterization and electrochemical properties of cyanide-bridged cobalt(III)/iron(II) complexes.
Syn React Inorg Met-Org Chem 1996;26(2):277-84.
3. Zhan S, Chen X, Meng Q.
Synthesis and properties of cyano-bridged nickel(II)-iron(III) complexes.
Transition Met Chem (London) 1996;21:181-3.
4. Chen X, Zhan S, Meng Q.
Synthesis and Spectroscopic Studies of Trinuclear Uranyl Complexes with Compartmental Ligands H₄L Derived From 2,6-Dipicolinoyl-hydrazine and 4-Acyl-1-Phenyl-3-Methyl-Pyrazolones-5 (Where Acyl = Benzoyl, Acetyl, iso-Butyryl or iso-Valeroyl).
Transition Met Chem (London) 1996;21:345-348.
5. Chen X, Zhan S, Hu C, Meng Q, Liu Y.
Synthesis, electrochemical and magnetic properties of Cu₃ complexes of a series of new compartmental trinucleating ligands H₄L.
J Chem Soc Dalton Trans. 1997:245-250.

6. Chen X, Zhan S, Hu C, Meng Q, Shun J.
Binickel(II) complex of a new asymmetrical acyclic ligand: the X-ray crystal structure of $[\text{Ni}_2\text{L}](\text{ClO}_4)_2$ reveals alternating square-planar and octahedral nickel ions.
Inorg Chim Acta 1997;260:95-98.

Publications from University of Idaho:

7. Chen X, Ji M, Fisher DR, Wai CM.
Carboxylate-derived calixarenes with high selectivity for actinium-225.
Chem Commun (Cambridge) 1998:377-378.
8. Wai CM, Hunt F, Ji M, Chen X.
Chemical reactions in supercritical carbon dioxide.
J Chem Edu 1998;75:641-645.
9. Zhan S, Hu C, Chen X, Meng Q, Lu C, Wang G, Zheng P.
Synthesis, structure, spectral and magnetic properties of a dinuclear copper(II)/nickel(II) complex bridged by glyoximate groups.
Polyhedron 1999;18:2035-2039.
10. Zhan S, Chen X, Vij A, Guo D, Meng Q.
Synthesis, studies and molecular structure of trinuclear cyanide-bridged copper-iron complexes.
Inorg Chim Acta 1999;292:157-162.
11. Ji M, Chen X, Wai CM, Fulton JL.
Synthesizing and dispersing silver nanoparticles in a water-in-supercritical carbon dioxide microemulsion.
J Am Chem Soc 1999;121:2631-2632.
12. Wai CM, Kulyako Y, Yak, H-K, Chen X, Lee S-J.
Selective Extraction of Strontium by Supercritical Fluid Carbon Dioxide.
Chem Commun (Cambridge) 1999:2533-2534.
13. Chen X, Ji M, Fisher DR, Wai CM.
Monofunctionalization of calix[4]arene tetracarboxylic acid at the upper rim with isothiocyanate group: first bifunctional chelating agent for alpha-emitter Ac-225.
Synlett 1999:1784-1786.
14. Chen X, Ji M, Fisher DR, Wai CM.
Ionizable calixarene-crown ethers with high selectivity for radium over lighter alkaline earth metal ions.
Inorg Chem 1999;38:5449-5552.

Publications from Syracuse University:

15. Femia, FJ, Chen X, Babich, JW, Zubieta J.
Oxorhenium(V) complexes containing tridentate Schiff-base and monothiol coligands.
Inorg Chim Acta 2000;300-302:517-524.
16. Femia, FJ, Chen X, Maresca KP, Shoup, TM, Babich, JW, Zubieta J.
Synthesis and characterization of complexes of the $\{\text{ReO}\}^{3+}$ core with SNS and S donor ligands.
Inorg Chim Acta 2000;306:30-37.
17. Chen X, Femia FJ, Babich, JW, Zubieta J.
Investigations of the $\{\text{ReO}\}^{3+}$ core: A “2+2” complex from bidentate and potentially trident ligands: $[\text{ReO}(\eta^2\text{-HOC}_6\text{H}_4\text{-2-CH}_2\text{NC}_6\text{H}_4\text{S})(\eta^2\text{-SC}_5\text{H}_4\text{N})(\text{PPh}_3)]$.
Inorg Chim Acta 2000;306:38-41.
18. Chen X, Femia FJ, Babich, JW, Zubieta J.
Structural characterizations of an Re(IV) complex $[\text{ReCl}_4(\text{OPPh}_3)_2]$ and of an imino species $[\text{ReOCl}_2(\text{PPh}_3)(2\text{-OC}_6\text{H}_4\text{-2-CH=NH})]$ prepared from the reaction of $[\text{ReOCl}_3(\text{PPh}_3)_2]$ with salicylaldoxime.
Inorg Chim Acta 2000;306:112-115.
19. Chen X, Femia FJ, Babich, JW, Zubieta J.
Synthesis and characterization of oxorhenium(V)–“3+1” mixed thiolate $[\text{SNS}]/[\text{S}]$ and $[\text{ONS}]/[\text{S}]$ complexes. Crystal and molecular structures of $[\text{ReO}(\eta^3\text{-SCH}_2\text{C}_5\text{H}_3\text{NCH}_2\text{S})(\eta^1\text{-C}_6\text{H}_4\text{Br-4-S})]$, $[\text{ReO}(\eta^3\text{-SCH}_2\text{C}_5\text{H}_3\text{NCH}_2\text{O})(\eta^1\text{-C}_6\text{H}_4\text{X-4-S})]$ (X=Cl, OMe), $[\text{ReO}(\eta^3\text{-SCH}_2\text{C}_5\text{H}_3\text{NCH}_2\text{O})(\eta^1\text{-C}_6\text{H}_4\text{OCH}_3\text{-4-CH}_2\text{S})]$.
Inorg Chim Acta 2000;307:88-96.
20. Chen X, Femia FJ, Babich, JW, Zubieta J.
Schiff base chemistry of the $\{\text{ReO}\}_3^+$ core: structural characterization of the unusual “3+2” complex $[\text{ReO}(\eta^3\text{-OC}_6\text{H}_4\text{-CH=NC}_6\text{H}_4\text{-2-S})(\eta^2\text{-OC}_6\text{H}_4\text{C=NC}_6\text{H}_4\text{-2-S})]$.
Inorg Chim Acta 2000;307:149-153.
21. Chen X, Femia FJ, Babich, JW, Zubieta J.
Exploring oxorhenium “3+1” mixed-ligand complexes carrying the S-benzyl-3-[(2-hydroxyphenyl)methylene]dithiocarbazate $[\text{ONS}]/\text{monothiol } [\text{S}]$ donor set: synthesis and characterization.
Inorg Chim Acta 2000;307:154-159.
22. Femia, FJ, Chen X, Maresca KP, Babich, JW, Zubieta J.
Synthesis and crystal and molecular structure of a tetranuclear cluster based on the rhenium(III)-bisorganohydrazino core: $[\text{Re}(\text{HNNC}_4\text{H}_3\text{N}_2)(\text{NNC}_4\text{H}_3\text{N}_2)(\text{OCH}_3)_2]_4$.
Inorg Chim Acta 2000;307:160-163.
23. Chen X, Femia FJ, Babich, JW, Zubieta J.
The syntheses and structures of “3+2” and “2+2+1” oxorhenium mixed-ligand complexes employing 8-hydroxy-5-nitroquinoline as the bidentate N,O donor ligand.
Inorg Chim Acta 2000;308:80-90.

24. Femia, FJ, Chen X, Maresca KP, Babich, JW, Zubieta J.
Syntheses and structural characterization of rhenium-bis-hydrazinopyrimidine core complexes with thiolate and Schiff base coligands.
Inorg Chim Acta 2000;310:210-216.
25. Chen X, Femia FJ, Babich, JW, Zubieta J.
An unexpected “4+2” [N3S]/[NS] rhenium(IV) complex formed upon cleavage of a Re(V) imido bond.
Inorg Chim Acta 2000;310:237-241.
26. Chen X, Femia FJ, Babich, JW, Zubieta J.
Spectroscopic and structural studies of complexes of the fac-[Re(N∩N)(CO)₃L]_{n+} type (N∩N=2-(2-pyridyl)benzothiazole; L=Cl, Br, CF₃SO₃⁻, CH₃CN).
Inorg Chim Acta 2001;314:91-96.
27. Chen X, Femia FJ, Babich, JW, Zubieta J.
Synthesis, characterization and crystal structures of mono-, di- and trinuclear rhenium(I) tricarbonyl complexes with 2,3,5,6-tetra(2-pyridyl)pyrazine.
Inorg Chim Acta 2001;315:66-72.
28. Chen X, Femia FJ, Babich, JW, Zubieta J.
Synthesis and structural characterization of rhenium(I) tricarbonyl complexes with the bidentate ligands o-(diphenylphosphino)benzaldehyde (P∩O) and o-[(diphenylphosphino)benzylidene]aniline (P∩N).
Inorg Chim Acta 2001;315:147-152.
29. Chen X, Femia FJ, Babich, JW, Zubieta J.
Schiff base chemistry of the rhenium(V)-oxo core with “3+2” ligand donor sets.
Inorg Chim Acta 2001;316:33-40.
30. Chen X, Femia FJ, Babich, JW, Zubieta J.
Rhenium(I) carbonyl complexes of 2,4,6-tris(2-pyridyl)-1,3,5-triazine (TPT). Rhenium (I)-promoted methoxylation of the triazine ring carbon atom in dinuclear rhenium complexes.
Inorg Chem 2001;40:2769-2777.
31. Femia FJ, Chen X, Babich JW, Zubieta J
Synthesis and characterization of a '3+2' {Re(V)O}(3+) core complex carrying the ONS/PO donor atom set.
Inorg Chim Acta 2001;316:145-8.
32. Ren X, Meng Q, Song Y, Lu C, Hu C, Chen X.
Unusual magnetic properties of one-dimensional molecule-based magnets associated with a structural phase transition.
Inorg Chem 2002;41:5686-5692.

33. Ren, X, Meng Q, Song Y, Hu C, Lu C, Chen X, Xue Z.
Unusual magnetic property associated with dimerization within a nickel tetramer.
Inorg Chem 2002;41:5931-5933.
34. Ren X, Wu P, Zhang W, Meng Q, Chen X.
Synthesis, crystal structure and magnetic properties of [RbzPy] [Fe(mnt)₂] complexes ([RbzPy]⁺ = 1-(4'-R-benzyl)pyridinium, R = NO₂ and Cl; mnt₂ = maleonitriledithiolate).
Transition Met Chem 2002;27:394-397.

Publications from University of Southern California:

35. Chen X, Park R, Shahinian AH, Bading JR, Conti PS.
Pharmacokinetics and tumor retention of ¹²⁵I-labeled RGD peptide are improved by PEGylation.
Nucl Med Biol 2004;31:11-19.
36. Chen X, Park R, Tohme M, Bading JR, Conti PS.
¹⁸F and ⁶⁴Cu-labeled RGD peptide for imaging breast cancer in mice with microPET.
Bioconjugate Chem 2004;15:41-49.
37. Chen X, Park R, Shahinian AH, Bading JR, Conti PS.
¹⁸F-Labeled RGD Peptide: Initial Evaluation for Imaging Brain Tumor Angiogenesis
Nucl Med Biol 2004;31:179-189.
38. Chen X, Park R, Khankaldyyan V, Tohme M, Bading JR, Laug WE, Conti PS.
MicroPET Imaging of Brain Tumor Angiogenesis with ¹⁸F-Labeled PEGylated RGD Peptide
Eur J Nucl Med Mol Imaging 2004;31:1081-1089.
39. Chen X, Park R, Hou Y, Tohme M, Shahinian AH, Bading JR, Conti PS
MicroPET and Autoradiographic Imaging of GRP Receptor Expression with ⁶⁴Cu-DOTA-[Lys³]bombesin in Human Prostate Adenocarcinoma Xenografts.
J Nucl Med 2004;45:1390-1397 (Cover feature)
40. Chen X, Hou Y, Tohme M, Park R, Khankaldyyan V, Gonzales-Gomez I, Bading JR, Laug WE, Conti PS.
PEGylated RGD Peptide: ⁶⁴Cu-Labeling and PET Imaging of Brain Tumor Angiogenesis
J Nucl Med 2004;45:1776-1783.
41. Chen X, Liu S, Hou Y, Tohme M, Park R, Bading JR, Conti PS.
MicroPET Imaging of Breast Cancer α_v -Integrin Expression with ⁶⁴Cu-Labeled Dimeric RGD Peptides.
Mol Imaging Biol 2004;6:350-359.
42. Chen X, Tohme M, Park R, Hou Y, Bading JR, Conti PS.
MicroPET Imaging of $\alpha_v\beta_3$ Integrin Expression with ¹⁸F-Labeled Dimeric RGD Peptide.
Mol Imaging 2004;3:96-104.

43. Chen X, Conti PS, Moats RA.
In Vivo Near-Infrared Fluorescence Imaging of Integrin $\alpha_v\beta_3$ in Brain Tumor Xenografts.
Cancer Res 2004;64:8009-8014.
44. Chen X, Sievers E, Hou Y, Park R, Tohme M, Bart R, Bremner R, Bading JR, Conti PS.
Integrin $\alpha_v\beta_3$ Targeted Imaging of Lung Cancer.
Neoplasia 2005;7:271-279.
45. Chen X, Plasencia C, Hou Y, Neamati N.
Synthesis and Biological Evaluation of Dimeric RGD Peptide-Paclitaxel Conjugate as Model for Integrin Targeted Drug Delivery.
J Med Chem 2005;48:1098-106.

Publications from Stanford University:

Year 2005 [5 papers]:

46. Cheng Z, Subbarayan M, Chen X, Gambhir SS.
Synthesis of (4-[^{18}F]fluorophenyl)triphenylphosphonium as a potential imaging agent for mitochondrial dysfunction.
J Labelled Compds Radiopharm 2005;48:131-7.
47. Kang KW, Min J-J, Chen X, Gambhir SS.
Comparison of [^{14}C]FMAU, [^3H]FEAU, [^{14}C]FIAU, and [^3H]PCV for Monitoring Reporter Gene Expression of Wild Type and Mutant Herpes Simplex Virus Type 1 Thymidine Kinase in Cell Culture.
Mol Imaging Biol. 2005;7:296-303.
48. Wu Y, Zhang X, Xiong Z, Cheng Z, Fisher Dr, Liu S, Gambhir SS, Chen X.
MicroPET Imaging of Glioma $\alpha(v)$ -Integrin Expression Using ^{64}Cu -Labeled Tetrameric RGD Peptide.
*J Nucl Med.*2005;46:1707-1718.
49. Cheng Z, Wu Y, Xiong Z, Gambhir SS, Chen X.
Near-Infrared Fluorescent RGD Peptides for Optical Imaging of Integrin $\alpha_v\beta_3$ Expression in Living Mice.
Bioconj Chem. 2005;16:1433-1441.
50. Cai W, Gambhir SS, Chen X.
Multimodality Tumor Imaging Targeting Integrin $\alpha_v\beta_3$
Biotechniques. 2005;39:S6-S17.

Year 2006 [20 papers]:

51. Chen X.
Multimodality Imaging of Tumor Integrin Expression.
*Mini-Reviews in Med Chem.*2006;6:227-234.

52. Chen X, Park R, Khankaldyyan V, Gonzales-Gomez I, Tohme M, Moats R, Bading JR, Laug WE, Conti PS.
Longitudinal MicroPET Imaging of Brain Tumor Growth with ^{18}F -Labeled RGD Peptide.
Mol Imaging Biol. 2006;8:9-15.
53. Zhang X, Xiong Z, Wu Y, Tseng JR, Gambhir SS, Chen X.
Quantitative PET Imaging of Tumor Integrin $\alpha_v\beta_3$ Expression with [^{18}F]FRGD2.
J Nucl Med. 2006;47:113-121.
54. Xiong Z, Cheng Z, Zhang X, Patel M, Wu JC, Gambhir SS, Chen X.
Imaging chemically modified adenovirus for targeting tumor expressing integrin $\alpha_v\beta_3$ in living mice with positron emission tomography.
J Nucl Med. 2006;47:130-139 (Cover feature)
55. Yang Y-S, Zhang X, Xiong Z, Chen X.
MicroPET imaging of gastrin-releasing peptide receptor expression with ^{64}Cu -labeled bombesin analogs in a mouse model of human prostate adenocarcinoma.
Nucl Med Biol. 2006;33:371-380.
56. Zhang X, Cai W, Cao F, Schreibmann E, Wu Y, Wu JC, Xing L, Chen X.
 ^{18}F -labeled bombesin analogs for targeting GRP receptor-expressing prostate cancer.
J Nucl Med. 2006;47:492-501.
57. Cai W, Zhang X, Wu Y, Chen X.
A thiol-reactive ^{18}F -labeling agent, N-[2-(4- ^{18}F -fluorobenzamido)ethyl]maleimide, and synthesis of RGD peptide-based tracer for PET imaging of $\alpha_v\beta_3$ integrin expression.
J Nucl Med. 2006;47(7):1172-1180.
58. Cao F, Lin S, Krishnan M, Ray P, Patel M, Drukker M, Dylla SJ, Connolly AJ, Chen X, Weissman I, Gambhir SS, Wu JC
In Vivo Visualization of Embryonic Stem Cell Survival, Proliferation, Migration, and Ablation after Cardiac Delivery
Circulation. 2006;113(7):1005-14.
59. Chen X
Multimodality Imaging of Tumor Integrin $\alpha_v\beta_3$ Expression.
Mini Rev Med Chem. 2006;6(2):227-34.
60. Wu Y, W Cai, Chen X.
Near-Infrared Fluorescence Imaging of Tumor Integrin $\alpha_v\beta_3$ Expression with Cy7-Labeled RGD Multimers.
Mol Imaging Biol. 2006;8(4):226-36.
61. Cai W, Shin D-W, Wu Y, Cao Q, Gheysens O, Gambhir SS, Wang SX, Chen X
Peptide-labeled near-infrared quantum dots for imaging tumor vasculature in living subjects.

Nano Lett. 2006;6:669-676.

62. Cheng Z, Levi J, Xiong Z, Gheysens O, Keren S, Chen X, Gambhir SS.
Near-Infrared Fluorescent Deoxyglucose Analogue for Tumor Optical Imaging in Cell Culture and Living Mice
Bioconjugate Chem. 2006;17:662-669.
63. Cai W, Chen X.
Anti-Angiogenic Cancer Therapy Based on Integrin Antagonism
Current Med Chem-Anti-Cancer Agents (CMC-ACA). 2006;6:407-428.
64. Dayam R, Aiello F, Wu Y, Garofalo A, Chen X, Neamati N.
Discovery of Small Molecule Integrin $\alpha_v\beta_3$ Receptor Antagonists as Novel Anticancer Agents
J Med Chem. 2006;49(15):4526-34.
65. Cai W, Wu Y, Chen K, Tice DA, Chen X
In Vitro and *In Vivo* Characterization of ^{64}Cu -Labeled AbegrinTM, a Humanized Monoclonal Antibody against Integrin $\alpha_v\beta_3$
Cancer Res. 2006;66(19):9673-81.
66. Hsu AR, Hou LC, Veeravagu A, Greve JM, Vogel H, Tse VCK, Chen X
In Vivo Near-Infrared Fluorescence Imaging of Integrin $\alpha_v\beta_3$ in an Orthotopic Glioblastoma Model
Mol Imaging Biol. 2006;8(6):315-23.
67. Chen X, Gambhir SS.
Significance of one-bead-one-compound combinational chemistry
Nat Chem Biol. 2006;2(7):351-352.
68. Cai W, Chen K, Mohamedali KA, Cao Q, Gambhir SS, Rosenblum MG, Chen X
 ^{64}Cu -Labeled VEGF₁₂₁ for Positron Emission Tomography Imaging of VEGFR Expression
J Nucl Med. 2006;47(12):2048-56.
69. Cai W, Rao J, Gambhir SS, Chen X
How molecular imaging is speeding up antiangiogenic drug development
Mol Cancer Ther. 2006;5(11): 2624-33.
70. Cao Q, Cai W, Li T, Yang Y, Chen K, Xing L, Chen X
Combined Integrin siRNA Therapy and Radiotherapy of Breast Cancer
Biochem Biophys Res Commun. 2006; 351(3):726-32.

Year 2007 [27 papers]:

71. Zhang X, Chen X.
Preparation and characterization of $^{99\text{m}}\text{Tc}(\text{CO})_3\text{-BPy-RGD}$ complex as $\alpha_v\beta_3$ integrin receptor targeted imaging agent.
Appl Radiat Isot. 2007;65(1):70-8.

72. Cheng Z, Xiong Z, Subbarayan M, Chen X, Gambhir SS
⁶⁴Cu-Labeled Alpha-Melanocyte-Stimulating Hormone Analog for MicroPET Imaging of Melanocortin 1 Receptor Expression
Bioconj Chem 2007;18:765-772.
72. Cai W, Zhang X, Olafsen T, Cao Q, Gambhir SS, Wu AM, Chen X
Positron Emission Tomography Imaging of Colorectal Cancer Using ¹⁸F-labeled T84.66 Anti-CEA Diabody.
J Nucl Med. 2007;48:304-310.
73. Veeravagu A, Hsu AR, Cai W, Hou LC, Tse VCK, Chen X
Vascular Endothelial Growth Factor and Vascular Endothelial Growth Factor Receptor (VEGFR) Inhibitors as Anti-Angiogenic Agents in Cancer Therapy.
Recent Patents on Anti-Cancer Drug Discovery. 2007;2(1):59-71.
74. Hsu AR, Veeravagu A, Cai W, Hou LC, Tse VCK, Chen X
Integrin $\alpha_v\beta_3$ antagonists for anti-angiogenic cancer treatment
Recent Patents on Anti-Cancer Drug Discovery. 2007;2:143-160.
76. Liu Z, Cai W, He L, Nakayama N, Sun X, Chen X*, Dai H*
In Vivo Biodistribution and Highly Efficient Tumor Targeting of Carbon Nanotubes in Mice
Nat Nanotechnol. 2007;2(1):47-52 [Highlighted by Science News].
77. Li Z, Cai W, Chen X
Semiconductor quantum dots for in vivo imaging
J Nanosci Nanotechnol. 2007;7:2567-2581.
78. Cai W, Chen K, He L, Cao Q, Chen X
Quantitative Positron Emission Tomography Imaging of EGFR Expression in Xenograft-Bearing Mice using ⁶⁴Cu-Labeled Cetuximab, a Chimeric Anti-EGFR Monoclonal Antibody
Eur J Nucl Med Mol Imaging. 2007;34:850-858.
79. Niu G, Xiong Z, Cheng Z, Cai W, Gambhir SS, Chen X
In Vivo Bioluminescence Tumor Imaging of RGD Peptide-Modified Adenoviral Vector Encoding Firefly Luciferase Reporter Gene
Mol Imaging Biol. 2007;9:126-134.
80. Hsu AR, Cai W, Veeravagu A, Chen K, Mohamedali KA, Vogel H, Hou LC, Tse V, Rosenblum MG, Chen X
Multimodality Molecular Imaging of Glioblastoma Growth Inhibition Using Vascular-Targeting Fusion Toxin VEGF₁₂₁/rGel
J Nucl Med. 2007;48(3):445-454.
81. Wu Z, Li Z-B, Cai W, Chin FT, Li F, Chen X
¹⁸F-labeled mini-PEG spacers RGD dimer (¹⁸F-FPRGD2): synthesis and microPET imaging of $\alpha_v\beta_3$ integrin expression

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Quantum Dot-Based Multimodality Agents
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NON-PEER-REVIEWED ARTICLES (TOTAL OF 4)

1. Chen X, Edwards WB, Anderson CJ, McCarthy TJ, Welch MJ.
Solid-phase synthesis of DOTA and TETA conjugated vasoactive intestinal polypeptide and in vivo behavior of copper-64 radiolabeled VIP conjugates.
J Labelled Compd Radiopharm 2001;44:S688-690.
2. Cai W, Chen X.
PET Imaging of Tumor Integrin Expression
Proceedings of 2005 IEEE Computational Systems Bioinformatics Conference 2005, pp340-349.
3. Cai W, Zhang X, Chen X
PET Imaging of Tumor Integrin $\alpha v \beta 3$ Expression: From Bench to Bedside
2005 Animal Molecular Imaging International Symposium, pp7-16.
4. Li Z, Cai W, Chen X
The Evolving Role of Nanotechnology in MI of Cancer
WCNMB 2006 Proceedings

PATENTS

1. Chen X, Wai C, Fisher DR.
Ion binding compounds, radionuclide complexes, methods of making radionuclide complexes, methods of extracting radionuclides, and methods of delivering radionuclides to target locations.
US Patent 6,075,130.
2. Fisher DR, Wai C, Chen X.
Radionuclide-binding compound, a radionuclide delivery system, a method of making a radium complexing compound, a method of extracting a radionuclide, and a method of delivering a radionuclide.
US Patent 6,117,413.
3. Chen X, Cai W, Gambhir SS, Wang H, Chen K, Rodriguez-Porcel M, Willmann JK

PET imaging of vascular endothelial growth factor receptor (VEGFR), compositions for VEGFR imaging, and methods of VEGFR imaging.
US Patent Application (11/881,384)

4. Chen X, Li Z-B
Imaging compounds, methods of making imaging compounds, methods of imaging, therapeutic compounds, methods of making therapeutic compounds, and methods of therapy.
US Patent Application (60/926,816)
5. Chen X, Lee H-Y
Iron Oxide Nanoparticles For Enhanced Imaging
US Patent Application (61/086,193)
6. Chen X, Li Z-B
RADIOLABELED BBN-RGD HETERODIMERS FOR CANCER TARGETING
US Patent Application (61/075,359)

CONFERENCE ABSTRACTS (TOTAL OF 155) [AVAILABLE UPON REQUEST]

INVITED LECTURES AND PRESENTATIONS (TOTAL OF 72)

1. Radiolabeled Peptides in MicroPET Imaging of Tumor Bearing Small Animal Models.
National Institute of Health, March, 2001
2. PET Imaging of Tumor Angiogenesis
USC Molecular Imaging Seminar Series (MISS), August, 2003
3. PET Imaging of Brain Tumor Angiogenesis
Stanford University, August, 2003
4. Molecular Imaging: Imaging at Molecular Level
Nanjing University, October, 2003
5. Imaging Tumor Integrin Expression
Childrens Hospital Los Angeles, January, 2004
6. Multimodality Imaging of Integrin $\alpha v \beta 3$
Purdue University, October, 2004
7. New Tracers
Grand Rounds, Stanford University, October, 2004
8. In Vivo Imaging of Integrin Alpha(v)Beta(3) Expression
MedImmune, Inc., August, 2005
9. PET Imaging of Tumor Integrin Expression: From Bench to Bedside

2005 Animal Molecular Imaging International Symposium, Taiwan, November 2005

10. ^{18}F -Labeled RGD Peptides: the Current Status
Institute of Nuclear Energy Research Atomic Energy Council, Taiwan, November, 2005
11. Multimodality Imaging of Integrin Expression
National Tsing Hua University, Taiwan, November, 2005
12. Multimodality Imaging of Tumor Integrin Expression
Beijing Association of Nuclear Medicine, November, 2005
13. Quantitative Imaging of Integrin Expression In Vivo
Beijing Normal University, November, 2005
14. The use of nanotechnology/quantum dot in imaging and drug/radiation delivery
Radiation Biology Program & Radiation Oncology Department Research Retreat, November, 2005
15. Positron Emission Tomography Imaging of Tumor Angiogenesis
University of Pennsylvania, March, 2006
16. VEGFR Targeted Imaging and Therapy
Grand Rounds, Stanford University, April, 2006
17. Molecular Imaging of Prostate Cancer
Department of Urology, Stanford University, July, 2006
18. Cancer Nanotechnology
Nuclear Chemistry Summer School, ACS Division of Nuclear Chemistry, July, 2006
19. Multimodality Imaging of Tumor Angiogenesis
Recent Advances in Molecular Imaging Symposium, 232nd ACS Meeting, September, 2006
20. The Evolving Role of Nanotechnology in MI of Cancer
9th World Congress of Nuclear Medicine and Biology (Korea), October, 2006
21. Nanotechnology in Molecular Imaging
Korean Research Institute of Chemical Technology (KRICT), October, 2006
22. VEGFR Targeted Imaging and Therapy
Beijing Normal University, October, 2006
23. Molecular Imaging Probes
Graduate School of the Chinese Academy of Sciences, Beijing, China, October, 2006
24. Molecular Imaging of Tumor Angiogenesis
National Tsing Hua University, Taiwan, October, 2006

25. Clinical Translation of PET Tracers
Chang-Gung Memorial Hospital, Taipei, October, 2006
26. Imaging Angiogenesis and Anti-angiogenic Treatment
Brigham and Women Hospital, Boston, MA, January, 2007
27. Nanotube Platform for Targeted Drug Delivery
1st International Symposium for Intelligent Drug Delivery System, Seoul, Korea, May 2007
28. Positron Emission Tomography Imaging of Tumor Angiogenesis
St. Louis University Cancer Center, August, 2007
29. Molecular MRI: How Far are We?
Chinese Academy of Science, March, 2007
30. Nanoplatfroms for Targeted Molecular Imaging and Therapy
Nanjing University, March, 2007
31. Tumor Angiogenesis Imaging
Kyungpook National University, Dagu, Korea, May, 2007
32. Tumor Angiogenesis Imaging
Seoul National University, Seoul, Korea, May, 2007
33. Tumor Angiogenesis Imaging
Sungkyunkwan University School of Medicine, Seoul, Korea, May 2007
34. Molecular Imaging in Cancer
NSTI Nanotech 2007, Santa Clara, CA, May 2007
35. Multimodality Imaging of Tumor Angiogenesis
Virginia Commonwealth University, July 2007
36. Nanotechnology in Molecular Imaging
Brown University, September, 2007
37. Multimodality Imaging of Tumor Angiogenesis
University of North Carolina, October, 2007
38. Multimodality Molecular Imaging and Therapy
Korea Institute of Science and Technology (KIST), October, 2007
39. Nanoplatfroms for Targeted Molecular Imaging in Living Subjects
Gwangju Institute of Science and Technology (GIST), October, 2007

40. Biological Modification of Quantum Dots for In Vivo Imaging
NCI Alliance Nanotechnology in Cancer Investigators Meeting, October, 2007
41. Angiogenesis Imaging
Neuroradiology Program, Stanford University, September, 2007
42. Multimodality Imaging of Angiogenesis
Emory University, December, 2007
43. Multimodality Imaging of Angiogenesis
University of Wisconsin-Madison, December, 2007
44. Biomedical Application of Single-walled Carbon Nanotubes, from In Vitro to In Vivo
Material Research Society 2007 Fall Meeting, November, 2007
45. Multimodality Imaging of Angiogenesis
University of Michigan, January, 2008
46. Molecular Imaging and Drug Assessment
Genentech, Inc., February, 2008
47. What's Next in Nanobio?
Stanford 2008 Nanobiotechnology Seminar Series, February, 2008
49. Peptide Probes in Molecular Imaging
Gordon Conference, February, 2008
50. PET Imaging of Angiogenesis
National Institute of Biomedical Imaging and Bioengineering (NIBIB), April, 2008
51. Nanotechnology in Molecular Imaging
UC Berkeley, April, 2008
52. Molecular Imaging and Drug Delivery
Arrowhead Conference, May, 2008
53. Angiogenesis Targeted Molecular Imaging and Therapy
Indiana University, June, 2008
54. Cancer Molecular Imaging
Indiana University, August, 2008
55. Iron Oxide Nanoplatfom Based Multimodality Molecular Imaging
American Academy of Nanomedicine, 4th Annual Symposium, Washington DC, September 2008
56. Nanoplatfom-based molecular imaging and therapy

Plenary lecture: 2008 IICR Symposium on Innovative Anti-Cancer Therapy, Seoul, Korea, October 24, 2008

57. Multimodality imaging of angiogenesis
Plenary lecture: 3rd Membrane Protein Symposium, Daejeon, Korea, November, 2008
58. Multimodality molecular cancer imaging
Joint SNM/RRS Symposium, Boston, MA, September, 2008
59. Angiogenesis Targeted Molecular Imaging and Drug Delivery
Purdue University, December 2008
60. Nanoplatfom-based multimodality molecular imaging probes
Hot Topics in Molecular Imaging (TOPIM 2009), Les Houches, France, Jan 2009
61. Molecular Imaging Primers
Harbin Medical University, Harbin, China, Feb, 2009
62. Molecular imaging of angiogenesis and anti-angiogenic treatment
USC Molecular Imaging Center Seminar Monthly Series, March 2009
63. Molecular Imaging in Drug Discovery and Drug Development
Trinity Biosystems, Menlo Park, CA, March, 2009
64. Imaging Response to Cancer Therapy
Stanford University Grand Rounds, March, 2009
65. Molecular Imaging in Drug Discovery
Peking University, May 2009
66. Multimodality Molecular Imaging
Peking University, May 2009
67. Molecular Imaging: Where We Have Been and Where We Are Going
Xijing Hospital, May 2009
68. Nanoplatfom-based Molecular Imaging and Therapy
Nanjing University, May 2009
69. Molecular Imaging Probes for Cancer Research
Jiangsu PhD Forum, May 2009
70. Molecular Imaging of Biologic's Penetration and Response in Target Tissue
2009 AAPS National Biotechnology Conference, Seattle, WA, June 2009
71. Inorganic Nanoparticles for Molecular Imaging

2009 AAPM 51st Annual meeting, Anaheim, CA, July 2009

72. Long Circulating Iron Oxide Nanoparticles For Biomedical Applications
238th ACS Annual meeting, Washington DC, August 2009

RESEARCH GRANTS :

ACTIVE

Source: NCI/NIH R01
Title: VEGFR-2 Targeted Imaging
Role: Principal Investigator
Period covered: 4/1/09 to 3/31/12
Goal: To develop VEGFR-2 specific protein mutants for site-specific labeling and multimodality imaging of tumor angiogenesis.

Source: NIH SBIR/STTR
Title: **Iron oxide nanoparticle probes for target specific MR molecular imaging**
Role: Principal Investigator (contact PI: Andrew Wang, Ocean Nanotechnology)
Period Covered: 1/1/09 to 12/31/10
Goal: This NIH STTR project intends to develop a new generation of iron oxide nanoparticles as target specific MRI contrast agents for early detection of breast cancer.

Source: NIH R01
Title: **Single-Walled Carbon Nanotubes as Delivery Vehicle for Cancer Therapy**
Role: Principal Investigator (contact PI: Hongjie Dai)
Period Covered: 07/01/08 to 06/30/13
Goal: To develop biocompatible single-walled nanotubes (SWNT) for tumor vascular specific delivery of chemotherapeutics and apply the state-of-the-art molecular imaging techniques to monitor the delivery and efficacy of drug loaded biocompatible SWNT.

Source: NCI/NIH R01
Title : **Radiolabeled RGD Peptides for Breast Cancer Imaging and Therapy**
Role: Principal Investigator
Period Covered: 9/30/07 to 8/31/11
Goal: To develop multimeric RGD peptides for imaging and therapy based upon integrin $\alpha\beta3$ recognition.

Source: NCI/NIH R01
Title: **Integrin $\alpha\beta3$ Targeted Drug Design, Delivery, and Imaging**
Role: Subcontractor (PI: Nouri Neamati, USC)
Period Covered: 12/1/07 to 11/30/12

- Goal: To develop peptide and non-peptide antagonists for integrin $\alpha v \beta 3$ targeted delivery of chemotherapeutics and to evaluate the anti-cancer treatment efficacy with non-invasive imaging techniques.
- Source: NCI/NIH R21
 Title: **Graphene-FeCo Nanocrystals for Highly Sensitive MRI, Cancer Imaging and Therapy**
 Role: Co-Investigator (PI: Hongjie Dai)
 Period covered: 3/1/08 to 2/28/10
 Goal: To develop FeCo nanoparticles for both T1 and T2 weighted MR imaging and as delivery vehicle for cancer therapy.
- Source: NCI/NIH R21
 Title: **Quantum Dots for NIR Fluorescence Imaging of Tumor Angiogenesis**
 Role: Principal Investigator
 Period Covered: 7/1/07 to 6/30/10
 Goal: The application focuses on preparing RGD-conjugated quantum dots for NIR fluorescence imaging of in vivo integrin expression.
- Source: DOD BCRP IDEA
 Title: **Mesenchymal Stem Cell as Targeted-Delivery Vehicle in Breast Cancer**
 Role: Principal Investigator
 Period Covered: 2/1/07 to 1/31/10
 Goal: To determine the effect of mesenchymal stem cell to target delivery of RGD4C-rmhTNF fusion protein to breast cancer lung metastasis with reduced toxicity.
- Source: NCI/NIH R01
 Title: **^{99m}Tc -Labeled Cyclic RGD Peptide Tetramers for Breast Cancer Imaging**
 Role: Subcontractor (PI: Shuang Liu, Purdue University)
 Period Covered: 12/1/06 to 11/30/11
 Goal: This project is related to the use of ^{99m}Tc -labeled cyclic RGDfK tetramers as radiopharmaceuticals for breast cancer imaging.
- Source : NCI U54
 Title : **Center for Cancer Nanotechnology Excellence at Stanford**
 Role : Co-investigator of RP5
 Period Covered : 12/1/05 to 11/30/10
 Goal : To develop a highly interactive and cohesive program that will produce breakthroughs towards developing and validating nanotechnologies for anti-cancer therapy response.
- Source : NCI/NIH R21
 Title: **Imaging $\alpha(v)\beta(3)$ Integrin Expression**
 Role: Principal Investigator
 Period Covered: 9/30/05 to 8/31/08 (no cost extension)

Goal: The goal of this proposal is to develop copper-64 ($t_{1/2} = 12.7$ h) labeled RGD peptide antagonists of $\alpha(v)\beta(3)$ integrin for positron emission tomography (PET) imaging of breast cancer tumor angiogenesis.

Source : Department of Defense OCRP
 Title: **Molecular Imaging of Ovarian Carcinoma Angiogenesis**
 Role: Principal Investigator
 Period Covered: 2/1/06 to 1/31/09 (no cost extension)
 Goal: The focus of this project is to develop novel radiopharmaceuticals that specifically home to integrin $\alpha_v\beta_3$, which is usually aberrantly up-regulated in ovarian cancer tumors.

Source: NCI P50 CA114747 Gambhir (PI)
 Title: **Stanford ICMIC**
 Role: PI on RP4 and Specialized Resource 1 (Chemistry/Radiochemistry)
 Period Covered: 07/01/05 to 06/30/10
 Goal: The goal of the program is to develop multidisciplinary multimodality molecular imaging strategies and incorporate projects that have a high potential for linking pre-clinical imaging models with clinical imaging for improved cancer patient care.

Source: Department of Defense PCR
 Title: **Imaging Heat Shock Protein 90 (Hsp90) Activity in Hormone-Refractory Prostate Cancer**
 Role: Mentor (Prostate Cancer Training Award for Gang Niu)
 Period Covered: 2/1/08 to 1/31/10
 Goal: To assess Hsp90 chaperone expression and activity non-invasively and in a real-time manner.

Source: TRDRP
 Title: **$\alpha 7$ -nAChR Targeted Imaging and Therapy of Lung Cancer**
 Role: Mentor (postdoctoral fellowship for Qizhen Cao)
 Period Covered: 10/1/08 to 9/30/10
 Goal: To develop novel imaging agents to evaluate dynamically the role of nicotine and $\alpha 7$ -nAChR on lung cancer progression and tumor angiogenesis.

FINISHED

Source: Society of Nuclear Medicine
 Title: **Tumor Vasculature Targeted Imaging and Therapy**
 Role: Mentor (Cassen Postdoctoral Fellowship for Weibo Cai)
 Period Covered: 4/1/06 to 3/31/08
 Goal: To develop novel radiolabeled peptides, proteins, and antibodies for molecular cancer imaging

Source: DOD BCRP Concept

- Title: **VEGF-Iron Oxide Conjugate for Dual MR and PET Imaging of Breast Cancer Angiogenesis**
 Role: Principal Investigator
 Period Covered: 1/1/07 to 12/31/07
 Goal: To label biocompatible iron oxide nanoparticle with VEGF and ⁶⁴Cu for dual PET/MRI imaging of breast cancer vascular Flt-1 and Flk-1/KDR status.
- Source : MedImmune, Inc.
 Title : **In Vivo Imaging at Stanford**
 Role : Principal Investigator
 Perior Covered : 12/1/05 to 11/30/07
 Goal : To evaluate the in vivo pharmacokinetics and tumor targeting efficacy of antibodies developed by MedImmune, Inc through multimodality radioimmunoimaging.
- Source: Department of Defense BCRP
 Title: **Alpha-v Integrin Targeted PET Imaging of Breast Cancer Angiogenesis and Low-Dose Metronomic Anti-Angiogenic Chemotherapy Efficacy**
 Role: Principal Investigator
 Period Covered: 09/01/04 to 08/31/07
 Goal: To use high-resolution microPET technology to image breast cancer angiogenesis and anti-angiogenic therapy efficacy.
- Source: Stanford
 Title: **VEGFR Targeted Imaging and Therapy of Glioblastoma Multiforme**
 Role: Principal Investigator (Dean's fellowship for Zibo Li)
 Period Covered: 07/01/06 to 06/30/07
 Goal: To combine targeted pro-apoptotic treatment approach with non-invasive PET imaging to evaluate brain tumor treatment efficacy.
- Source : Stanford
 Title : **Tumor-Targeted Delivery of Small Interfering RNA (siRNA) Using Nanoparticles**
 Role: PI (Dean's fellowship for Weibo Cai)
 Period Covered: 07/01/05 to 06/30/06
 Goal: To validate and optimize the nanoparticle siRNA delivery system for specific tumor-targeting in vivo through a combinational approach of chemistry, biology and molecular imaging.
- Source : Stanford
 Title : **Combined Integrin siRNA Therapy and Radiotherapy of Breast Cancer**
 Role: PI (Dean's fellowship for Qizhen Cao)
 Period Covered: 01/01/06 to 12/31/06
 Goal: To increase breast cancer sensitivity to radiation by siRNA ablation of integrin expression.

- Source: NIBIB/NIH R21
Title: **MicroPET and NIR Fluorescence Imaging Tumor Angiogenesis**
Role: Principal Investigator
Period Covered: 09/15/03 to 08/31/06
Goal: To image and quantify *in vivo* expression of the vitronectin receptor $\alpha_v\beta_3$ integrin on human malignant tumor cells, as well as activated endothelial cells during neovascularization, by means of both radionuclide imaging (such as PET) and biomedical optical imaging (such as near-infrared (NIR) fluorescence imaging) techniques.
- Source: Department of Defense PCRP
Title: **Imaging Primary Prostate Cancer and Bone Metastasis**
Role: Principal Investigator
Period Covered: 04/01/03 to 03/31/06
Goal: To develop radiolabeled bombesin analogs for microPET imaging of both androgen independent and androgen dependent prostate cancer tumors in preclinical animal models.
- Source: Department of Defense
Title: **Development of Quantum Dot Probes for Near-Infrared Fluorescence Imaging of Breast Cancer Angiogenesis**
Role: Principal Investigator
Period Covered: 10/01/03 to 9/30/04
Goal: To develop semiconductor nanoparticles tagged RGD peptides and evaluate their *in vivo* kinetics and tumor targeting efficacy by optical imaging means.
- Source: American Lung Association of California
Title: **Vasoactive Intestinal Peptide Receptor Targeted Imaging of Lung Cancer**
Role: Principal Investigator
Period Covered: 07/01/03 to 06/30/05
Goal: To perform 3 D pharmacophore search to develop metabolically stable VIP peptide analogs and label with F-18 for PET imaging of lung cancer.
- Source: The Wright Foundation
Title: **PEGylated RGD Peptide for PET Imaging of Tumor Angiogenesis**
Role: Principal Investigator
Period Covered: 07/01/03 to 06/30/04
Goal: To optimize RGD peptide with poly(ethylene glycol) and label the RGD-PEG conjugate with F-18 and Cu-64 for PET imaging of $\alpha_v\beta_3$ integrin positive tumors.
- Source: SNM Education and Research Education Foundation
Title: **PET Imaging of EGF Receptor**
Role: Principal Investigator
Period Covered: 07/01/03 to 06/30/04

Goal: To Label human and rodent epidermal growth factors with fluorine-18 for PET imaging of both estrogen-dependent and estrogen-independent breast cancer tumors.

Source: American Cancer Society

Title: **Imaging urokinase-receptor/integrin complexes in human breast cancer angiogenesis**

Role: Principal Investigator

Period Covered: 07/01/02 to 06/30/03

Goal: To design heterobifunctional ligands for $\alpha_v\beta_3$ integrin/uPAR for tumor angiogenesis targeting.

Source: National Cancer Institute

Title: **Development of a cellular and molecular-based cancer imaging center**

Role: Co-Investigator (PI: Peter S. Conti)

Period Covered: 07/01/01 to 06/30/04

Goal: To develop a cellular and molecular-based cancer imaging center at USC.

Source: MedActinium, Inc.

Title: **Development and Evaluation of Bioconjugates with Actinium for Radiotherapy Applications**

Role: Principal Investigator

Period Covered: 01/01/03 to 11/30/03

Goal: To determine the stability of bifunctional chelating agents with actinium-227 in biological media.

Note: All the active grants were transferred to Stanford upon joining NIH.