Resume of Douglas C. Youvan July 1, 2006

Personal:

Born January 29, 1955
Frontenac, Kansas USA

Email: doug@youvan.com
Websites: www.youvan.com www.pseudocolor.com

Education:

1969	Private Pilot
1968-70	Associate Degree in Electronics, Pittsburg State University
1970-74	B.S., Biology with minors in Math, Physics, &Chemistry, PSU
1975-80	Biophysics Ph.D., University of California, Berkeley
	(Ph.D. and B.S. transcripts are available)

Selected Teaching Experience:

1978	Biophysical Chemistry, U.C. Berkeley - Undergraduate
1982-83	Molecular Biology, Stony Brook - Undergraduate
1990-93	Chemistry Lab, MIT - Undergraduate, non-majors in Chemistry
1989-93	General Chemistry, MIT, Freshman non-majors in Chemistry
1986-93	Thesis Advisor, MIT, 5 Ph.D. and 2 M.S. degrees
1986-93	Postdoctoral Advisor, MIT, 3 Ph.D. 'postdocs'
1986-93	Undergraduate Research Advisor, MIT, ~10 students

Work Experience:

1981-83	Staff, Lawrence Berkeley National Lab
1983-86	Staff, Exxon Research and Engineering Company
1983-86	Staff, Cold Spring Harbor Laboratory
1986-87	Assistant Professor, MIT Applied Biological Sciences
1988-93	Associate Professor, MIT Chemistry
1994-02	CEO and CSO, Kairos Scientific Inc., Silicon Valley & San Diego
1996-01	Editor, Biotechnology et alia
1993-02	Adj. Associate Professor of Pharmaceutical Chemistry, UCSF

Publications Summary:

150	Scientific Publications
11	Pending and Issued US Patents
500	Patent References
1,500	Hyperlinks at Yahoo and Google
2	Books (one in progress)

Publications Listed by PubMed:

1: Characterization of a symmetrized mutant RC with 42 residues from the QA site replacing residues in the Q(B) site.
Li J, Coleman WJ, Youvan DC, Gunner MR.
Photosynth Res. 2000;64(1):41-52.

2: Application of a very high-throughput digital imaging screen to evolve the enzyme galactose oxidase.
Delagrave S, Murphy DJ, Pruss JL, Maffia AM 3rd, Marrs BL, Bylina EJ, Coleman WJ, Grek CL, Dilworth MR, Yang MM, Youvan DC.
Protein Eng. 2001 Apr;14(4):261-7.

3: Molecular phylogenetic evidence for noninvasive zoonotic transmission of Staphylococcus intermedius from a canine pet to a human.
Tanner MA, Everett CL, Youvan DC.
J Clin Microbiol. 2000 Apr;38(4):1628-31.

4: Primary charge separation routes in the BChl:BPhe heterodimer reaction centers of Rhodobacter sphaeroides
van Brederode ME, van Stokkum IH, Katilius E, van Mourik F, Jones MR, van Grondelle R.
Biochemistry. 1999 Jun 8;38(23):7545-55.

5: Hydrogen bonding and circular dichroism of bacteriochlorophylls in the Rhodobacter capsulatus light-harvesting 2 complex altered by combinatorial mutagenesis. Hu Q, Sturgis JN, Robert B, Delagrave S, Youvan DC, Niederman RA.
Biochemistry. 1998 Jul 14;37(28):10006-15.

6: Site-directed mutations near the L-subunit D-helix of the purple bacterial reaction center: a partial model for the primary donor of photosystem II.
Coleman WJ, Mattioli TA, Youvan DC, Rutherford AW.
Biochemistry. 1997 Feb 25;36(8):2178-87.

7: Structure and fluorescence mechanism of GFP.
Youvan DC, Michel-Beyerle ME.
Nat Biotechnol. 1996 Oct;14(10):1219-20.

8: Dual color microscopic imagery of cells expressing the green fluorescent protein and a red-shifted variant.
Yang TT, Kain SR, Kitts P, Kondepudi A, Yang MM, Youvan DC.
Gene. 1996;173(1 Spec No):19-23.

9: Fluorescence resonance energy transfer between blue-emitting and red-shifted excitation derivatives of the green fluorescent protein
Mitra RD, Silva CM, Youvan DC.
Gene. 1996;173(1 Spec No):13-7. Review.

10: Green fluorescent protein: untapped potential in immunotechnology.
Larrick JW, Balint RF, Youvan DC.
Immunotechnology. 1995 Aug;1(2):83-6. Review.

11: ENDOR studies of the primary donor cation radical in mutant reaction centers

of Rhodobacter sphaeroides with altered hydrogen-bond interactions.
Rautter J, Lendzian F, Schulz C, Fetsch A, Kuhn M, Lin X, Williams JC, Allen JP, Lubitz W.
Biochemistry. 1995 Jun 27;34(25):8130-43.

12: Green fluorescent pets.
Youvan DC.
Science. 1995 Apr 14;268(5208):264.

13: Context dependence of phenotype prediction and diversity in combinatorial mutagenesis.
Delagrave S, Goldman ER, Youvan DC.
Protein Eng. 1995 Mar;8(3):237-42.

14: Red-shifted excitation mutants of the green fluorescent protein.
Delagrave S, Hawtin RE, Silva CM, Yang MM, Youvan DC.
Biotechnology (N Y). 1995 Feb;13(2):151-4.

15: Digital imaging spectroscopy for massively parallel screening of mutants.
Youvan DC, Goldman E, Delagrave S, Yang MM.
Methods Enzymol. 1995;246:732-48.

17: Spectral alterations in Rhodobacter capsulatus mutants with site-directed changes in the bacteriochlorophyll-binding site of the B880 light-harvesting complex.
Olivera LM, Westerhuis WH, Niederman RA.
Biochim Biophys Acta. 1994 May 18;1185(3):318-26.

18: Imaging sequence space.
Youvan DC.
Nature. 1994 May 5;369(6475):79-80.

19: Atavistic reaction centre.
Coleman WJ, Youvan DC.
Nature. 1993 Dec 9;366(6455):517-8.

20: Searching sequence space to engineer proteins: exponential ensemble mutagenesis.
Delagrave S, Youvan DC.
Biotechnology (N Y). 1993 Dec;11(13):1548-52.

21. Hydropathy and molar volume constraints on combinatorial mutants of the photosynthetic reaction center.
Robles SJ, Youvan DC.
J Mol Biol. 1993 Jul 5;232(1):242-52.

22: Recursive ensemble mutagenesis.
Delagrave S, Goldman ER, Youvan DC.
Protein Eng. 1993 Apr;6(3):327-31.

23: An algorithmically optimized combinatorial library screened by digital imaging spectroscopy.
Goldman ER, Youvan DC.

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24: Probing the primary donor environment in the histidineM200-->leucine and histidineL173-->leucine heterodimer mutants of Rhodobacter capsulatus by light-induced Fourier transform infrared difference spectroscopy.
Nabedryk E, Robles SJ, Goldman E, Youvan DC, Breton J.
Biochemistry. 1992 Nov 10;31(44):10852-8.

25: An algorithm for protein engineering: simulations of recursive ensemble mutagenesis.
Arkin AP, Youvan DC.
Proc Natl Acad Sci U S A. 1992 Aug 15;89(16):7811-5.

26: Optimizing nucleotide mixtures to encode specific subsets of amino acids for semi-random mutagenesis.
Arkin AP, Youvan DC.
Biotechnology (N Y). 1992 Mar;10(3):297-300.

27: Femtosecond spectral evolution of the excited state of bacterial reaction centers at 10 K.
Vos MH, Lambry JC, Robles SJ, Youvan DC, Breton J, Martin JL.
Proc Natl Acad Sci U S A. 1992 Jan 15;89(2):613-7.

28: Direct observation of vibrational coherence in bacterial reaction centers using femtosecond absorption spectroscopy.
Vos MH, Lambry JC, Robles SJ, Youvan DC, Breton J, Martin JL.
Proc Natl Acad Sci U S A. 1991 Oct 15;88(20):8885-9.

29: Photosynthetic reaction centers: interfacing molecular genetics and optical spectroscopy.
Youvan DC.
Trends Biochem Sci. 1991 Apr;16(4):145-9. Review.

30: Effects of pigment-protein interactions on the conformation of the primary electron acceptor in Rhodobacter capsulatus reaction centers.
Peloquin JM, Bylina EJ, Youvan DC, Bocian DF.
Biochim Biophys Acta. 1991 Jan 3;1056(1):85-8.

31: Resonance Raman studies of genetically modified reaction centers from Rhodobacter capsulatus.
Peloquin JM, Bylina EJ, Youvan DC, Bocian DF.
Biochemistry. 1990 Sep 11;29(36):8417-24.

32: Applications of imaging spectroscopy in molecular biology. II. Colony screening based on absorption spectra.
Arkin AP, Goldman ER, Robles SJ, Goddard CA, Coleman WJ, Yang MM, Youvan DC.
Biotechnology (N Y). 1990 Aug;8(8):746-9.

33: EPR characterization of genetically modified reaction centers of Rhodobacter capsulatus.
Bylina EJ, Kolaczkowski SV, Norris JR, Youvan DC.
Biochemistry. 1990 Jul 3;29(26):6203-10.

34: Partial symmetrization of the photosynthetic reaction center.
Robles SJ, Breton J, Youvan DC.
Science. 1990 Jun 15;248(4961):1402-5.

35: Stark effect in wild-type and heterodimer-containing reaction centers from Rhodobacter capsulatus.
DiMagno TJ, Bylina EJ, Angerhofer A, Youvan DC, Norris JR.
Biochemistry. 1990 Jan 30;29(4):899-907.

36: Spectroscopic analysis of genetically modified photosynthetic reaction centers.
Coleman WJ, Youvan DC.
Annu Rev Biophys Biophys Chem. 1990;19:333-67. Review.

37: Electron transfer in a genetically modified bacterial reaction center containing a heterodimer.
Kirmaier C, Holten D, Bylina EJ, Youvan DC.
Proc Natl Acad Sci U S A. 1988 Oct;85(20):7562-6.

38: Plasmid pU29, a vehicle for mutagenesis of the photosynthetic puf operon in Rhodopseudomonas capsulata.
Bylina EJ, Ismail S, Youvan DC.
Plasmid. 1986 Nov;16(3):175-81.

39: Chromosomal deletion and plasmid complementation of the photosynthetic reaction center and light-harvesting genes from Rhodopseudomonas capsulata.
Youvan DC, Ismail S, Bylina EJ.
Gene. 1985;38(1-3):19-30.

40: Molecular genetics and the light reactions of photosynthesis.
Youvan DC, Marrs BL.
Cell. 1984 Nov;39(1):1-3.

41: Nucleotide and deduced polypeptide sequences of the photosynthetic reaction-center, B870 antenna, and flanking polypeptides from R. capsulata.
Youvan DC, Bylina EJ, Alberti M, Begusch H, Hearst JE.
Cell. 1984 Jul;37(3):949-57.

42: Isolation and characterization of enhanced fluorescence mutants of Rhodopseudomonas capsulata.
Youvan DC, Hearst JE, Marrs BL.
J Bacteriol. 1983 May;154(2):748-55.

43: R-prime site-directed transposon Tn7 mutagenesis of the photosynthetic apparatus in Rhodopseudomonas capsulata.
Youvan DC, Elder JT, Sandlin DE, Zsebo K, Alder DP, Panopoulos NJ, Marrs BL, Hearst JE.
J Mol Biol. 1982 Nov 25;162(1):17-41.

44: Sequencing psoralen photochemically reactive sites in Escherichia coli 16 S rRNA.
Youvan DC, Hearst JE.

Anal Biochem. 1982 Jan 1;119(1):86-9.

45: A sequence from Drosophila melanogaster 18S rRNA bearing the conserved hypermodified nucleoside am psi: analysis by reverse transcription and high-performance liquid chromatography.
Youvan DC, Hearst JE.
Nucleic Acids Res. 1981 Apr 10;9(7):1723-41.

46: Reverse transcriptase pauses at N2-methylguanine during in vitro transcription of Escherichia coli 16S ribosomal RNA.
Youvan DC, Hearst JE.
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47: Structure of psoralen-crosslinked ribosomal RNA from Drosophila melanogaster.
Wollenzien PL, Youvan DC, Hearst JE.
Proc Natl Acad Sci U S A. 1978 Apr;75(4):1642-6.

48: Morphology of extremely heat-resistant spores from Bacillus sp. ATCC 27380 by scanning and transmission electron microscopy.
Youvan D, Watanabe M, Holmquist R.
Life Sci Space Res. 1977;15:65-72.

Publications Available Online at www.et-al.com :

1. Fluorescence Imaging Micro-Spectrophotometer (FIMS) by D.C. Youvan, W.J. Coleman, C.M.Silva, J.Petersen, E.J.Bylina and M.M.Yang.

2. Calibration of Fluorescence Resonance Energy Transfer in Microscopy Using Genetically Engineered GFP Derivatives on Nickel Chelating Beads by D.C.Youvan, C.M.Silva, E.J. Bylina, W.J.Coleman, M.R.Dilworth and M.M.Yang.

3. High Resolution Imaging Microscope (HIRIM) by M.M. Yang, W.J. Coleman, C.M. Silva, M.R. Dilworth, E.J.Bylina, and D.C.Youvan.

4. Graphical User Interface for Single-Pixel Spectroscopy by M.M. Yang, M.R. Dilworth, and D.C. Youvan.

5. Multispectral Bacterial Identification by M.A. Tanner, W.J. Coleman, C.L. Everett, S.J. Robles, M.R. Dilworth, M.M. Yang, and D.C. Youvan.

6. Directed Evolution and Solid Phase Enzyme Screening by E.J. Bylina, C.L. Grek, W.J.Coleman, and D.C. Youvan.

7. Complex Microbial Communities Inhabiting Sulfide-rich Black Mud from Marine Coastal Environments by M.T. Tanner, C.L. Everett, W.J. Coleman, M.M Yang, and D.C. Youvan.

Selected Publications with on-line Abstracts at www.kairos-scientific.com:

1. Combinatorial Mutagenesis Algorithms, Digital Imaging Spectroscopy, and Solid-Phase Assays for Directed Evolution. In, Enzyme Functionality, Design, Engineering, and Screening. Ed. A. Svendsen. Marcel Dekker, Inc., New York. 2004.
2. Evolving and Screening Enzymes for New Activities on Polymer Substrates. In, *Biocatalysis in Polymer Science*. Eds: R.A. Gross and H.N.Cheng. American Chemical Society, Washington D.C. 2003.
3. Application of a very high-throughput digital imaging screen to evolve the enzyme galactose oxidase. *Protein Engineering,* 2001.
4. Solid Phase Enzyme Screening. *ASM News,* 2000.
5. Molecular Phylogenetic Evidence for Noninvasive Zoonotic Transmission of *Staphylococcus intermedius* from a Canine Pet to a Healthy Human Host. *Journal of Clinical Microbiology*, 2000.
6. Directed Evolution and Solid Phase Enzyme Screening. *SPIE, 3926:186-191*.
7. Multispectral Bacterial Identification. *SPIE,* 3913: 45-53.
8. Graphical User Interface for Single-Pixel Spectroscopy. *SPIE,* 3924:108-115.
9. Hydrogen Bonding and Circular Dichroism of Bacteriochlorophylls in the *Rhodobacter capsulatus* Light Harvesting 2 Complex Altered by Combinatorial Mutagenesis. *Biochemistry,* 1998.
10. Dramatic Reduction in Fluorescence Quantum Yield in Mutants of Green Fluorescent Protein due to Fast Internal Conversion. *Chemical Physics,* 1998.
11. Time-Resolved Spectroscopy of Wild-type and Mutant Green Fluorescent Proteins Reveals Excited State Deprotonation Consistent with Fluorophore-Protein Interactions. *Chemical Physics*, 1996.
12. Structure and Fluorescence Mechanism of GFP. *Nature Biotechnology*, 1996.
13. Comparison of a β-glucosidase and a β-mannosidase from the Hyperthermophilic Archeon *Pyrococcus furiosus*: Purification, Characterization, Gene Cloning and Sequence Analysis. *J. Biol. Chem*. 271, 1996.
14. Dual Color Microscopic Imagery of Cells Expressing the Green Fluorescent Protein and a Red-Shifted Variant. *Gene*, 1996.
15. Fluorescent Proteins and Applications. Vol. 173, dedicated issue of *Gene*.
16. Fluorescence Resonance Energy Transfer Between Blue Emitting and Red-shifted Excitation Derivatives of the Green Fluorescent Protein. *Gene*, 1996.
17. Searching Sequence Space. *Nature Biotechnology*, 1995.
18. Green Fluorescent Pets. *Science*, 1995.
19. Red-Shifted Excitation Mutants of the Green Fluorescent Protein. *Nature Biotechnology*, 1995.
20. Context Dependence of Phenotype Prediction and Diversity in Combinatorial Mutagenesis. *Protein Engineering*, 1995.
21. Estimating Protein Function from Combinatorial Sequence Data Using Decision Algorithms and Neural Networks. *Drug Dev. Res*, 1994.
22. Digital Imaging Spectroscopy for Massively Parallel Screening of Mutants. *Meth. Enzym*, 1994.
23. Imaging Sequence Space. *Nature*, 1994.
24. Atavistic Reaction Centre, *Nature*, 1993.
25. Searching Sequence Space: Exponential Ensemble Mutagenesis, *Nature Biotechnology*, 1993.
26. Hydropathy and Molar Volume Constraints on Combinatorial Mutants of the Photosynthetic Reaction Center. *J. Mol. Biol, 1993.*
27. Genetic Algorithms and Recursive Ensemble Mutagenesis in Protein Engineering. *Complexity International*. http://www.csu.edu.au/ci/vol1/fuellen/REM.html
28. Recursive Ensemble Mutagenesis. *Protein Engineering*, 1993.
29. Study of Wild Type and Genetically Modified Reaction Centers from *Rhodobacter capsulatus*: Structural Comparison with *Rhodopseudomonas viridis* and *Rhodobacter sphaeroides*. *Biophys. J.,* 1993.
30. An Algorithmically Optimized Combinatorial Library Screened by Digital Imaging Spectroscopy. *Nature Biotechnology*, 1992.
31. An Algorithm for Protein Engineering: Simulation of Recursive Ensemble Mutagenesis. *PNAS,* 1992.
32. Optimizing Nucleotide Mixtures to Encode Specific Subsets of Amino Acids for Semi-Random Mutagenesis. *Nature Biotechnology*, 1992.

33. Analysis of Spontaneous Herbicide Resistant Revertants Derived from *Rhodobacter capsulatus* in which Serine L223 of the Reaction Center is Replaced with Alanine. In: *Research in Photosynthesis*, 1992.
34. Direct Observation of Vibrational Coherence in Bacterial Reaction Centers Using Femtosecond Spectroscopy. *PNAS*, 1991.
35. Reaction Centers: Interfacing Molecular Genetics and Optical Spectroscopy. *Trends in Biochemical Sciences*, 1991.
36. Genetic Coding Algorithms for Engineering Membrane Proteins. In: *Reaction Centers of Photosynthetic Bacteria*, 1990.
37. Partial Symmetrization of the Photosynthetic Reaction Center. *Science*, 1990.
38. EPR Characterization of Genetically Modified Reaction Centers of *Rhodobacter capsulatus*. *Biochemistry*, 1990.
39. Spectroscopic Analysis of Genetically Modified Photosynthetic Reaction Centers. *Ann. Rev. of Biophysics and Biophysical Chemistry*, 1990.
40. The Stark Effect in Wild-type and Heterodimer Containing Reaction Centers from *Rhodobacter capsulatus*. *Biochemistry*, 1990.
41. Influence of an Amino Acid Residue on the Optical Properties and Electron Transfer Dynamics of a Photosynthetic Reaction Centre Complex. *Nature*, 1988.
42. Directed Mutations Affecting Spectroscopic and Electron Transfer Properties of the Primary Donor in the Photosynthetic Reaction Center. *PNAS*, 1988.
43. Molecular Mechanisms of Photosynthesis. *Scientific American,* 1987.
44. Light Harvesting II (B800 + 850 Complex) Structural Genes from *Rps. capsulata*. *PNAS*, 1985.
45. Molecular Genetics and the Light Reactions of Photosynthesis. *Cell* 39, 1984.
46. Nucleotide and Deduced Polypeptide Sequence of the Photosynthetic Reaction Center, B870 Antenna, and Flanking Polypeptides from *Rps. capsulata*. *Cell*, 1984.

Books:

1. Microbial energy transduction: Genetics, structure, and function of membrane proteins Youvan, Douglas C. Youvan and Fevzi Daldal, Eds. Cold Spring Harbor Laboratory (Cold Spring Harbor, N.Y.) 181 p.

2. Pseudocolor in Pure and Applied Mathematics. Douglas C. Youvan. 2006-07, in progress, and on-line at: www.pseudocolor.com .

US Patents:

1	6,834,122	Visualization and processing of multidimensional data using prefiltering and sorting criteria
2	6,738,502	Multispectral taxonomic identification
3	6,661,909	Calibration of fluorescence resonance energy transfer in microscopy
4	6,472,163	Solid phase enzyme kinetics screening in microcolonies
5	6,456,734	Calibration of fluorescence resonance energy transfer in microscopy

6	5,914,245	Solid phase enzyme kinetics screening in microcolonies
7	5,852,498	Optical instrument having a variable optical filter
8	20050114801	Visualization and processing of multidimensional data using prefiltering and sorting criteria
9	20020118870	Calibration of fluorescence resonance energy transfer in microscopy
10	20020025537	High-throughput methods for generating and screening compounds that affect cell viability
11	20010036304	Visualization and processing of multidimensional data using prefiltering and sorting criteria

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