Sona Vasudevan, Ph.D. is an Assistant Professor of Biochemistry and Molecular Biology, Georgetown University Medical Center, and also holds the position of Senior Bioinformatics Scientist at Protein Information Resource (PIR). Her primary expertise is in the area of structural bioinformatics. At PIR she is spear-heading a novel approach for functional prediction and subsequent annotation of UniProtKB/Swiss-Prot proteins using 3D-structures. She has significantly contributed to internationally renowned protein resources such as PIR, Clusters of Orthologous Groups (COGs), Conserved Domain Database (CDD), and Molecular Modeling Database (MMDB) at NCBI. Her major research interests include comparative genomics, protein classification, evolutionay analysis and structural bioinformatics.

WORK EXPERIENCE:

Research Assistant Professor, Department of Chemistry and Biochemistry & Senior Bioinformatics Scientist, Protein Information Resource (PIR), Georgetown University Medical Center, Washington, DC (July 2004-Present)

Protein Bioinformatics Scientist, National Center for Biotechnology Information, National Institutes of Health, 8600 Rockville Pike, Bethesda, MD. Contracted through Computercraft Inc. (August 2001-July 2004)

EDUCATION:

Ph.D. Medical Biophysics, University of Toronto, Canada (1996)

Visiting Scientist with Dr. David Davies, National Institute of Kidney and Digestive Diseases, National Institutes of Health, Bethesda, Maryland, MD (February 2001-August 2001)

Post-doctoral Fellow with Dr. Thomas R. Cech, Distinguished Professor and Nobel Laureate Department of Biochemistry, Howard Hughes Medical Institute, University of Colorado, Boulder CO (April 1999-February 2001)

Post-doctoral Fellow jointly with Zaverio M. Ruggeri, Head, Department of Experimental Medicine and Kottayil Varughese, Professor, The Scripps Research Institute, La Jolla, CA (October 1996-April 1999)

HONORS AND AWARDS:

Howard Hughes Research fellow (1999-2001)

Skaggs Research Fellowship, Scripps Research Institute (1998-1999)

International Human Frontier Science Program Long-term Post-doctoral Fellowship (1996-1998)

University of Toronto - Open Doctoral Fellowship (1993 – 1996)

University of Toronto - Differential Fee Waiver Scholarship (1993 – 1994)

Merck-Frosst-Canadian Society of Biochemistry & Molecular Biology Student Travel Award 1995

Connaught Scholarship - University of Toronto's prestigious fellowship (1992)

University of Madras's Grants Commission Merits Scholarship, Madras, India (1986-1988)

Ranked first M.Sc. & M.Phil. Degree examinations in Biophysics & Crystallography

Krishnaswamy Endowment Prize for Proficiency in Physics (1983)

TEACHING EXPERIENCE:

Invited Tutorials:

Comparative analysis of protein structures: Principles, tools, and applications for establishing evolutionary relationship and predicting function. **Sona Vasudevan** and Raja Mazumder. **ISMB, July 2007, Vienna, Austria. (**Accepted invitation to submit this tutorial to PloS Computational biology.)

A Family-based Ligand-centric Approach for Protein Functional Annotation. **Sona Vasudevan***, Hongzhan Huang & Cathy H. Wu. Laptop Presentation, **ISMB, July 2007, Vienna, Austria**

Courses:

BCHB-541: Structural Molecular Biology, Georgetown University, *Course Director*, spring 2008.

BINF732: Structural Bioinformatics, George Mason University (2006)

BCHB-521: Bioinformatics, Protein Structure and Function, Georgetown University (2005, 2006, 2007).

TBIO-530 Bioinformatics, Biomarkers, and Functional Genomics, Protein Structure and Function, Lombardi Cancer Center, Georgetown University (October 2005, 2007).

Applied Bioinformatics, Resources available at the National Center for Biotechnology Information, University of Maryland Medical School (October 2003).

STUDENT MENTORING ACTIVITIES:

Aparna Pallavajjala, Structural and evolutionary analysis of Pyridoxal Phosphate (PLP) dependent enzymes Georgetown University, 2007 (January-May)

Subha R & Sathya K. Closer look into FAD binding sites, Co-supervisor, Masters Thesis, Dept. of Biophysics, University of Madras, 2007 (January-May)

Michael Brennan, Structure-Based Ligand-Centric Protein Analysis Using 5'-adenylyl-imido-triphosphate (ANP), Georgetown University, 2006 (September-December)

Paul Maranan Ramos, Protein Structure- and Family-based annotation of Ligand binding sites, Georgetown University, 2006 (January-April)

Sundeep Shahi, Canonical loop conformations in antibodies, University of Toronto, 1995

Chrysa Latrick, Core domain of HIV integrase and inhibitors, National Institutes of Health, 2001

INVITED TALKS:

A ligand-centric approach for functional annotation of proteins. Janelia Farms Research Campus, HHMI, September 24, (2007).

A Structural approach for Functional Annotation of Hypothetical Proteins. J. Craig Venter Institute, August 15, (2007).

Protein Classification, Indian Bioinformatics Institute, Bangalore, India, December 26, (2006).

Evolutionary Approach to Structural Biology, Lombardi Cancer Center, Georgetown University, October 7, (2003).

Structural Bioinformatics: Principles and Applications, Department of Computer Science, Georgetown University, (2003).

Modeling and functional analysis of the interaction between von Willebrand factor A1 domain and glycoprotein Ibα interactions. International Society of Haemostasis and Thrombosis (1999), Washington D.C., August 15.

Modeling of A1 domain GP1ba interactions. Gordon Conference on Hemostasis (1998), Plymouth State College, Plymouth, New Hampshire, June 28-July 3

Structure of Protein S fragment, Buffallo-Hamilton-Toronto Crystallographic Meeting, (1995), University of Toronto, Toronto, Canada.

PUBLICATIONS:

Book chapters:

Sona Vasudevan & David R. Rose. Conformation of Antibodies and their Fragments (Review). In: Conformational changes in biological macromolecules, Molecular Biology Intelligence Unit Series, R.G. Landes & Co. S. Subbiah (Ed.). Chapter VII pp-109-134 (1996).

Raja Mazumder, **Sona Vasudevan** & Anastasia N. Nikolskaya. Protein functional annotation by homology (Review). In: Methods in Molecular Biology series, Humana Press, USA. (in press)

Review articles:

Y. Yan, **S. Vasudevan**, H. Nguyen and D. Merlin. Intestinal Epithelial CD98: An Oligomeric and Multifunctional Protein. BBA - Molecular Cell Research (2007) (Review) (in press)

L Aravind, Raja Mazumder, **Sona Vasudevan** and Eugene.V Koonin.
Trends in protein evolution inferred from sequence and structure analysis (Review). *Curr. Opin. Struct. Biol*. (2002). **12**(3):392-399.

Peer-Reviewed:

Yutao Yan, **Sona Vasudevan**, Viviene Nduati, Shanthi Sitaraman, Didier Merlin. Extracellular Interaction between hCD98 and the PDZ Class II Domain of hCASK in Intestinal Epithelia. *J. Membrane Biology*, 2007 Apr 17.

Koonin EV, Fedorova ND, Jackson JD, Jacobs AR, Krylov DM, Makarova KS, Mazumder R, Mekhedov SL, Nikolskaya AN, Rao BS, Rogozin IB, Smirnov S, Sorokin AV, Sverdlov AV, **Vasudevan S**, Wolf YI, Yin JJ, Natale DA. A comprehensive evolutionary classification of proteins encoded in complete eukaryotic genomes. *Genome Biol*. (2004); 5(2). R7.

Rajaram Gana, Sarma Dittakavi, Rajalakshmi Srinivasan & **Sona Vasudevan***
Representing Sequences of Biological Macromolecules Using Prime Numbers. METMBS 2004**:** 223-224

Sona Vasudevan, Reha Celikel, Kottayil Varughese, Zaverio M. Ruggeri and Thomas R.Kunicki. Crystal Structure of Fab Ap7.4-an anti-integrin antibody mimicking a RGD sequence. *Blood Cells Mol Dis*. 2004 Jan-Feb; 32(1):176-81.

Roman L. Tatusov, Natalie D. Fedorova, John D. Jackson, Aviva R. Jacobs, Boris Kiryutin, Eugene V. Koonin, Dmitri M. Krylov, Raja Mazumder, Sergei L. Mekhedov, Anastasia N. Nikolskaya, B. Sridhar Rao, Sergei Smirnov, Alexander V. Sverdlov, **Sona Vasudevan**, Yuri I. Wolf, Jodie J. Yin, Darren A. Natale.The COG database: an updated version includes eukaryotes. *BMC Bioinformatics* (2003). **4***(41).*

Rogozin I.B., Babenko V.I., Fedorova N.D., Jackson J.D., Jacobs A.R., Krylov D.M., Makarova K.S., Mazumder R., Mekhedov S.L., Mirkin B.G., Nikolskaya A.N., Rao B.S., Smirnov S., Sorokin A.V., Sverdlov A.V., **Vasudevan S**., Wolf Y.I., Yin J.J., Natale D.A., Koonin E.V.
Evolution of eukaryotic gene repertoire and gene structure: discovering the unexpected dynamics of genome evolution. *Cold Spring Harb Symp Quant Biol*. 2003. 68:293-301.

Raja Mazumder, Lakshminarayan M. Iyer, **Sona Vasudevan** and L. Aravind.
Detection of novel members, structure-function analysis and evolutionary classification of the 2H phosphoesterase superfamily. *Nucleic Acid Research* (2002). **30**(23), 5229-5243.

Udayaditya Sen*****, **Sona Vasudevan*,** Gowtham Subbarao, Richard A. McClintock, Reha Celikel, Zaverio M. Ruggeri & Kottayil I. Varughese. (***contributed equally**). Crystal Structure of the von Willebrand Factor Modulator Botrocetin. *Biochemistry* (2001). **40**(2), 345-352.

Sona Vasudevan, James R. Roberts, Richard A. McClintock, Judith A. Dent, Reha Celikel, Jerry Ware, Kottayil I. Varughese and Zaverio M. Ruggeri. Modeling and functional analysis of the interaction between von Willebrand factor A1 domain and glycoprotein Ib interactions. *Journal of Biological Chemistry* (2000). **275**, **17**:12763-12768.

Sona Vasudevan, Takashi Tsuruo & David R. Rose. Mode of binding of antibody MRK-16 to its antigen: A crystallographic and molecular modeling study. *J. Biol. Chem*. (1998). **273, 39**:25413-25419.

Sona Vasudevan, Kathy Johns, Takashi Tsuruo & David R Rose, Preliminary crystallographic analysis of anti P glycoprotein specific Fab MRK-16 in complex with its antigenic peptide. *Protein & Peptide Letters*. (1996). **3**, 147-151.

Sona Vasudevan, Kathy Johns & David R Rose. Preliminary crystallographic analysis of a Fab specific for P-glycoprotein with & without bound peptide, *J. Mol. Biol*. (1994). **241,** 736-738.

Sona Vasudevan & N. Gautham, Conformational similarities between crystallographically independent molecules in organic crystals, *Acta. Cryst*. (1992). **B48**, 111-113.

Database related peer-reviewed publications:

The UniProt Consortium. The Universal Protein Resource (UniProt). *Nucleic Acids Research, 2007,* Nucleic Acids Res. 2007 Nov 27.

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Marchler-Bauer A, Anderson JB, DeWeese-Scott C, Fedorova ND, Geer LY, He S, Hurwitz DI, Jackson JD, Jacobs AR, Lanczycki CJ, Liebert CA, Liu C, Madej T, Marchler GH, Mazumder R, Nikolskaya AN, Panchenko AR, Rao BS, Shoemaker BA, Simonyan V, Song JS, Thiessen PA, **Vasudevan S**, Wang Y, Yamashita RA, Yin JJ, Bryant SH. CDD: a curated Entrez database of conserved domain alignments. *Nucleic Acids Res*. (2003). **31**(1):383-387.

Chen J, Anderson JB, DeWeese-Scott C, Fedorova ND, Geer LY, He S, Hurwitz DI, Jackson JD, Jacobs AR, Lanczycki CJ, Liebert CA, Liu C, Madej T, Marchler-Bauer A, Marchler GH, Mazumder R, Nikolskaya AN, Rao BS, Panchenko AR, Shoemaker BA, Simonyan V, Song JS, Thiessen PA, **Vasudevan S**, Wang Y, Yamashita RA, Yin JJ, Bryant SH. MMDB: Entrez's 3D-structure database. *Nucleic Acids Res*. (2003). **31**(1):474-477.