Dorina Saro
Curriculum Vitae

Biologics Research,
Biotechnology Center Of Excellence,
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Education

***Yale University*, School of Medicine**, New Haven, CT
Laboratory of Dr. Patrick Sung, Molecular Biophysics and Biochemistry Department
Postdoctoral Associate – 2007-2009
Project: "Functional and Structural Characterization of Proteins involved in DNA Repair and Cancer"
Laboratory of Dr. Lynne Regan, Molecular Biophysics and Biochemistry Department
Postdoctoral Associate – 2005-2007
Project: "Biophysical Characterization of TRP repeat proteins"

Wayne State University, Detroit, MI
Ph.D. Chemistry (Biochemistry) – November 2004
Advisor: Prof. Mark Spaller
Ph.D. Dissertation: "Thermodynamic and Structural Studies of the PDZ Domain"

University of Tirana, Tirana, Albania.
B.Sc. Chemistry – July 1996 – graduated 2nd out of 120 students
Thesis: "Assessment of the Environmental Impact on the Quality of Lana River Water"

Honors and Awards

- Selected to give a talk at the ASBMB (American Association of Biochemistry and Molecular Biology) Meeting, San Diego, CA, April 2012.
- Awarded travel fund from Fanconi Anemia Foundation to attend the 23rd Annual Fanconi Anemia Research Fund's Scientific Symposium in Barcelona, Spain, October 2011.
- Selected to give a short talk at the FASEB Meeting: "Helicases and Nucleic Acid Translocases: Structure, Mechanism, Function, and Roles in Human Diseases", Steamboat Springs, CO, July 2011.
- First Prize in Poster Presentation, MB&B Departmental Retreat, Yale University, West Haven Campus, CT, September 2010.
- Research featured in Cincinnati Children's Hospital Medical Center. "Newly identified proteins critical to Fanconi anemia pathway DNA repair function." ScienceDaily, 2010.
- Research featured in Yale News. "Yale Researchers Find Protein is a Key Tool in Chromosomal Repair Kit", September 2010.
- First Prize in Poster Presentation, Graduate Chemistry Symposium, Wayne State University, Detroit, MI, September 2002.
- Wayne Sate University Excellence in Teaching Award, 2001.
- Excellent Student Award from the Albanian Ministry of Education, 1992-1993.
- Excellent Student Scholarship from the University of Tirana, 1994-1995.

Research Experience

Biologics Research,
Biotechnology Center of Excellence, Johnson & Johnson
Research Scientist *September 2013-present*

- Develop and implement innovative biophysical methods in the characterization of biologics with focus in high-throughput formats.
- Utilize internal and external capabilities to bring in new technologies and assays to the group.
- Team leader with responsibilities of managing a group of three scientists.

Yale University, Molecular Biophysics and Biochemistry,
Laboratory of Dr. Patrick Sung
Associate Research Scientist *January 2010 – August 2013*
Postdoctoral Associate *March 2007 – December 2009*

- Characterized the functional role of protein complexes involved in DNA repair and cancer with focus on Fanconi Anemia's FANCM helicase.
- Discovered that two histone fold-containing proteins, MHF1 and MHF2 assemble into a stable heterodimeric complex that binds DNA and enhances the activity of FANCM.
- Showed that MHF complex recognizes junction DNA by structural and biochemical approaches. This activity is essential for proper positioning of FANCM and stimulation of the DNA processing activity of this enzyme.
- Used Small Angle X-ray Scattering for structural characterization of proteins involved in DNA recombination, repair and cancer.

Yale University, Molecular Biophysics and Biochemistry,
Laboratory of Dr. Lynne Regan
Postdoctoral Associate *January 2005 – February 2007*

- Studied biophysical properties of repeat proteins with focus on Ssn6-mediated complexes.
- Used biophysical methods to study the coiled-coil multimeric nature of Tup1 protein and its complex formation with Ssn6.

Wayne State University, Chemistry Department,
Laboratory of Dr. Mark Spaller
Graduate Research Assistant *September 1999 – November 2004*

- Ph.D. Dissertation: "Thermodynamic and Structural Studies of the PDZ Domain"
- Studied thermodynamics of PDZ mediated interactions with peptide ligands.
- Solved the crystal structures of two complexes of PDZ domain with peptide ligands and identified the key interactions responsible for complex formation (PDB codes: 1TQ3, 1TP3 and 1TP5).
- Showed that branched hydrophobic residues are preferred at the PDZ-peptide interface by designing and testing a library of peptides that contained unnatural amino acids.

- Designed and tested novel cyclic and bivalent ligands with higher affinity for PDZ domain and good cellular properties.

University of Tirana, Faculty of Natural Sciences, Albania
Undergraduate Student *January 1996 – June 1996*

- Thesis: "Assessment of the environmental impact on the quality of Lana river water"
- Collected samples at different locations, analyzed the chemical composition, oxygen consumption and metal traces of various samples.
- Performed advanced statistical analysis of the data.

Teaching and Mentoring

Yale University, *Associate Research Scientist* & *Postdoctoral Associate*, *2005-2012*

- Mentored graduate student Xiao-Feng Zheng during her PhD thesis research.
- Mentored undergraduate students Van Vu and Ryan Salinas from "The Science, Technology and Research Scholars" (STARS) Program at Yale College. This program is designed to support women, minority, economically underprivileged, and other historically underrepresented students in the sciences, engineering, and mathematics.
- Mentored summer student Tamuka Chidyausiku (Claflin University) from "The Sackler Institute Undergraduate Fellowship" at Yale. This program enables undergraduates (primarily rising juniors and seniors) interested in pursuing a career in the sciences to conduct interdisciplinary research at Yale for a 10-week period during the summer.
- Mentored summer student Charissa Kahue (Chaminade University of Honolulu) from "Yale BioSTEP" (Biomedical Science Training and Enrichment Program). This program provides intensive, short-term research training for undergraduates, especially students from groups underrepresented in biomedical sciences.

Wayne State University, *Graduate Student*, *1999-2004*
Mentored undergraduate students, Amy Griffin, Alexandra Jittu, Adam Markesino, Dena Pichette and Nicole Hughes in the laboratory of Dr. Mark Spaller during their thesis research.

Wayne State University, *Teaching Assistant*, *1999-2001*
General, Analytical Chemistry and Biochemistry Laboratories and Discussion sessions for Science majors (4 semesters). * *Wayne Sate University Excellence in Teaching Award*

University of Tirana, Albania, *Lecturer*, *1996-1999*
Taught General and Inorganic Chemistry to students in the Chemistry Department, Faculty of Natural Sciences and Faculty of Medicine. Lead Laboratory and Discussion sessions for these subjects (6 semesters).

Professional Affiliations and Activities

- Board member of the BITC (Biomolecular Interactions Technology Center)
- Member of American Chemical Society
- Member of the American Society for Biochemistry and Molecular Biology
- Member of Phi Lambda Upsilon, Alpha Psi Chapter (Chemical Honorary Society)
- Member of the New York Academy of Sciences
- Active participant in departmental and interdepartmental activities at Yale and WSU

Publications

Li X, Geng SB, Chiu ML, **Saro D**, Tessier PM.A high-throughput assay for measuring monoclonal antibody self-association and aggregation in serum. *Bioconjugate Chemistry*. 2015 Feb 25.

Zhao Q*, **Saro D***, Sachpatzidis A, Singh TR, Schlingman D, Zheng XF, Mack A, Tsai M-S, Mochrie S, Regan L, Meetei AR, Sung P, Xiong Y. "The MHF complex senses branched DNA by binding a pair of crossover DNA duplexes." *Nature Communications*, 2014; 5:2987.
* equal contribution

Zhao W, Xu D, **Saro D**, Hammel M, Kwon Y, Rambo R, Williams G J, Chi P, Xue X, Lu L, Pezza R, Camerini-Otero D, Wang H, Sung P. "Mechanistic insights into the role of Hop2-Mnd1 in meiotic homologous DNA pairing." *Nucleic Acids Research*, 2014 Jan; 42(2):906-17.

Busygina V, **Saro D**, Williams G, Leung W-K, Sehorn M, Tsubouchi H, Sung P. "Novel attributes of Hed1 affect dynamics and activity of the Rad51 presynaptic filament during meiotic recombination" *Journal of Biological Chemistry*, 2012, 287(2), 1566-75.

Zheng XF, Prakash R, **Saro D**, Longerich S, Niu H, Sung P. "Processing of DNA structures via DNA unwinding and branch migration by the S. cerevisiae Mph1 protein" *DNA Repair* (Amst), 2011, 10(10), 1034-1043.

Dray E, Etchin J, Wiese C, **Saro D,** Williams G J, Hammel M, Yu X, Galkin V E, Liu D, Tsai M S, Sy S M, Schild D, Egelman E, Chen J, Sung P. "Enhancement of RAD51 recombinase activity by the tumor suppressor PALB2" *Nat Struct Mol Biol*. 2010, 17(10), 1255-9.

Singh TR*, **Saro D***, Ali AM, Zheng XF, Du CH, Killen MW, Sachpatzidis A, Wahengbam K, Pierce AJ, Xiong Y, Sung P, Meetei AR. "MHF1-MHF2, a histone-fold-containing protein complex, participates in the Fanconi anemia pathway via FANCM" *Mol Cell.* 2010, 37(6), 879-86.
* equal contribution
Comment in Mol Cell. 2010, 37(6), 749-51.

Dray E*, **Saro D*,** Sung P. "Chromosome damage repair: strategies and complications in targeting the BRCA2-PALB2 axis for cancer therapy" Review, *Cellscience* 2008.
* equal contribution

Klosi E, **Saro D,** Spaller M R. "Bivalent peptides as PDZ domain ligands" *Bioorganic & Medicinal Chemistry Letters*, 17(22), 2007, 6147-6150.

Saro D, Li T, Paredes A, Rupasinghe C, Caspers N, Spaller M R. "A Thermodynamic Ligand Binding Study of the third PDZ Domain (PDZ3) from the Mammalian Neuronal Protein PSD-95" *Biochemistry*, 2007, 46 (21), 6340 -6352.

Udugamasooriya G, **Saro D,** Spaller M R. "Side-chain bridged cyclic ligands as inhibitors of PDZ mediated interaction" *Organic Letters*, 2005, 7(7), 1203-1206.

Saro D, Klosi E, Paredes A, Spaller, M R. "Thermodynamic Analysis of a Hydrophobic Binding Site: Probing the PDZ Domain with Nonproteinogenic Peptide Ligands" *Organic Letters*, 2004, 6(20), 3429-32.

Li T, **Saro D**, Spaller M R. "Thermodynamic Profiling of Conformationally Constrained Cyclic Ligands for the PDZ Domain" *Bioorganic & Medicinal Chemistry Letters*, 14(6), 2004, 1385-1388.

Book chapter:

Saro D, Baker A, Hepler R, Spencer S, Bruce R, LaBrenz S, Chiu M, Davis D, Lang SE. "Developability assessment of a proposed NIST monoclonal antibody material", American Chemical Society books, "Biopharmaceutical Characterization"

Manuscripts in preparation:

(Available upon request)

Saro D, Sachpatzidis A, Zheng X-F, Zhao Q, Singh T, Meetei R, Xiong Y, Sung P. "A conserved region of MHF1 plays an important role in complex formation with FANCM and in the function of MHF1-MHF2 complex in DNA repair"

Saro D, Udugamasooriya G, Kovari L C, Spaller M R. "Structural and Thermodynamic Insights in the PDZ Domain Binding Through a Combined X-ray Crystallographic and Titration Calorimetric Approach"

Presentations

Invited Talks:

Saro, D. "Developability risk assessments to select bispecific antibody candidates" Antibody Engineering & Therapeutics Conference, IBC 25th Annual meeting, Huntington Beach, LA, December 2014

Saro, D. "The function of FANCM-mediated complexes in DNA repair" Experimental Biology 2012 ASBMB (American Association of Biochemistry and Molecular Biology) Meeting, San Diego, CA, April 2012.

Saro, D. "Structural insights into the function of FANCM-mediated complexes" FASEB Meeting: "Helicases and Nucleic Acid Translocases: Structure, Mechanism, Function, and Roles in Human Diseases", Steamboat Springs, CO, July 2011.

Saro, D. "Structural insights into the function of FANCM-mediated complexes" Sackler Discussion Group, Raymond and Beverly Sackler Institute for Biological, Physical and Engineering Sciences, New Haven, CT, December 2010.

Poster Presentations:

Saro D, Sachpatzidis A, Zheng X-F, Singh T R, Meetei A R, Xiong Y, Sung P. "The function of FANCM-mediated complexes in DNA repair" Experimental Biology 2012 ASBMB (American Association of Biochemistry and Molecular Biology) Meeting, San Diego, CA, April 2012.

Saro D, Sachpatzidis A, Zheng X-F, Singh T R, Meetei A R, Xiong Y, Sung P. "Structural insights into the function of FANCM-mediated complexes" 23rd Annual Fanconi Anemia Research Fund Scientific Symposium, Barcelona, Spain, October 2011.

Saro D, Sachpatzidis A, Zheng X-F, Singh T R, Meetei A R, Xiong Y, Sung P. "Structural insights into the function of FANCM-mediated complexes" FASEB Meeting: "Helicases and Nucleic Acid Translocases: Structure, Mechanism, Function, and Roles in Human Diseases", Steamboat Springs, CO, July 2011.

Saro D, Sachpatzidis A, Zheng X-F, Singh T R, Meetei A R, Xiong Y, Sung P. "The function of FANCM-mediated complexes in DNA repair" 10th Annual "Structural Biology of DNA Repair" Program Project Workshop, Berkeley, CA, April 2011.

Saro D, Sachpatzidis A, Zheng X-F, Singh T R, Meetei A R, Xiong Y, Sung P. "Structural insights into the function of FANCM-mediated complexes" 21st Annual Fanconi Anemia Research Fund Scientific Symposium, Minneapolis, MN, October 2010.

Saro D, Sachpatzidis A, Zheng X-F, Singh T R, Meetei A R, Xiong Y, Sung P. "The function of FANCM-mediated complexes in DNA repair" Yale University, Molecular Biophysics and Biochemistry Departmental Retreat, West Haven Campus, CT, October 2010. *(Winner of poster prize)*

Saro D, Williams G, Hammel M, Sung P "Insights into the PALB2/BRCA1 interaction"
8th Annual "Structural Biology of DNA Repair" Program Project Workshop, Berkeley, CA, March 2009.

Saro D, Regan L J. "Biophysical Characterization of TPR mediated interactions" Bioorganic Gordon Conference, Andover, NH, June 2005.

Saro D, Klosi E, Udugamasooriya G, Li T, Spaller MR "Thermodynamic and Structural Analysis of PDZ mediated Interactions" Wayne State University, Chemistry Department Symposium, Detroit, MI, September 2002. *(Winner of poster prize)*

Spaller M R, Li T, **Saro D**, Udugamasooriya G, Piserchio A, Mierke D, Salinas G, Marshall J. "From combinatorial synthesis to cellular probes: designing novel cyclic peptide ligands as inhibitors of signal transduction proteins" 9th Naples workshop Peptides as therapeutics, diagnostics and vaccines, Italy, March 2004.

Saro D, Li T, Klosi E, Udugamasooriya G, Spaller M R. "Design and Thermodynamic Binding Studies of Cyclic and Multivalent Peptide Ligands for the PDZ Domain" 18th American Peptide Symposium, Boston, MA, July 2003.

Conference Abstracts:

Udugamasooriya G, **Saro D**, Spaller M R. "(Re)examining conformational constraint as a design strategy for protein-binding peptides" Biopolymers, Volume: 80 Issue: 4 Pages: 536-537, Published: 2005

Li T, **Saro D**, Spaller M R. "Thermodynamic and structural studies of ligands for the third PDZ domain (PDZ3) of mammalian PSD-95" Abstracts of Papers of the American Chemical Society, Vol 228 Pages: U196-U196 Part: Part 1 Meeting Abstract: 154-BIOL Published: 2004

Saro D, Li T, Klosi E, et al. "From combinatorial synthesis to cellular probes: designing cyclic and multivalent peptide ligands as inhibitors of signal transduction proteins" Journal of Peptide Science, Volume: 10 Pages: 115-115 Published: 2004

Saro D, Li T, Klosi E, et al. "Design and thermodynamic binding studies of cyclic and multivalent peptide ligands for the PDZ domain" Biopolymers, Volume: 71 Issue: 3 Pages: 413-413 Meeting Abstract: P516 Published: 2003

Additional Training

"Biologics Formulation Summit" May 2014, *Janssen Pharmaceuticals*, Malvern, PA, USA

"Wyatt's Light Scattering Users Meeting", November 2013, Princeton, NJ

"Workshop on Hydrodynamic and Thermodynamic Analysis of Macromolecules with SEDFIT and SEDPHAT" *National Institute of Health*, Bethesda, MD, February 2006.

"Rapid Data Collection and Structure Solving at the NSLS: A Practical Course in Macromolecular X-Ray Diffraction Measurement" Biology Department and National Synchrotron Light Source, *Brookhaven National Laboratory*, Brookhaven, NY, April 2005.

"Intensive course in Modern Methods of Analytical Chemistry", *University of Ioannina and Erasmus Program of European Community*, Ioannina, Greece, July 1996.

References

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