



**Prof. Dr. Silvio C. E. Tosatto**

Born on **21 December 1974** in Bressanone (Italy).

**Full Professor** in Bioinformatics (Professore ordinario, SSD BIO/10, Biochemistry) and Principal Investigator at the [BioComputing UP](#) lab of the [Dept. of Biomedical Sciences, Università degli Studi di Padova](#) (2007 - present).

**Associate member** of the CNR Institute of Neuroscience, Padua section (since 2015).

**PhD** (*Dr. rer. nat.*, Grade: *Magna cum laude*, 2002) in **bioinformatics** (computer science) and **Graduate in Computer Science & Business Administration** (*Diplom Wirtschaftsinformatiker*, 1998) from the [Universität Mannheim](#) (Germany).

**Institutional contacts:**

**BioComputing Laboratory**

Department of Biomedical Sciences

Università di Padova

Viale G. Colombo 3

I-35121 Padova

Italy

+39-049-827 6269

+39-049-827 6260

silvio.tosatto@unipd.it

[protein.bio.unipd.it](http://protein.bio.unipd.it)

**Research**

**Vision**

My scientific work concentrates in the fields of bioinformatics and computational biology, with a special emphasis on the structural and mechanistic aspects of complex systems. Over the last fifteen years, two main pillars have emerged: (a) development of novel methods, tools and databases to study proteins at different levels (sequence, structure, folding, function, interactions) and (b) application of the methods to solve biologically relevant questions in different contexts. These aspects reinforce one another, as the development of novel methods is guided by specific biological questions which in turn benefit from methodological advances. In all instances, the structural aspects of proteins are leveraged to propose novel biological mechanisms. Recently, a focus is emerging on understanding the fundamental principles underlying complex systems, such as signaling in neurons or cancer development, as a deterministic (and predictable) process based on emerging properties. The vision for my future research is to try to uncover the evolutionary “logic gates” used in protein interactions to perform cellular functions of bewildering complexity.

## **Research lines**

Our current lines of research are broadly divided in:

### *(a) Methodology*

The lab has been developing both tools and databases for proteins at different levels (sequence, structure, folding, function, interactions). These are mostly covered by the topics of the COST Action [NGP-net](#). In particular, we have been very active in the ELIXIR infrastructure for biological data [Elixir-Europe](#), where I am currently the Deputy Head of Node for Italy and a Lead for the User Community on Intrinsically Disordered Proteins. Engaging ELIXIR has allowed the group both to leverage the expertise provided by this European consortium as well as to significantly increase the visibility and impact of our resources. Testimony of this is the fact that we have recently joined the Pfam and InterPro consortia coordinated by EMBL-EBI (see publication list).

### *(b) Applications*

The lab is centered on understanding signaling networks in cancer and neurons. Cancer signaling is studied in terms of angiogenesis and metabolic adaptation induced by hypoxia through the von Hippel-Lindau (VHL) and hypoxia inducible factor (HIF) pathways. Neuronal signaling is studied from the perspective of understanding mutations causing intellectual disability, e.g. RETT-like syndromes. Genetic data from patients is analyzed to find novel candidate mutations and understand their contribution to pathology. Specific proteins of widely unknown function (e.g. TANC2) are then analyzed in-depth with experimental molecular and cellular biology as well as biochemistry techniques guided by in silico hypotheses. A similar approach is taken to a lesser degree in collaboration to study epilepsy and neurodegeneration.

## **Publications**

### [List of publications](#)

## **Previous positions**

- Associate Professor, Dept. of Biomedical Sciences, University of Padova. (2013 - 2016)
- Associate Professor, Dept. of Biology, University of Padova. (2007 - 2013)
- Brain gain ("[Rientro dei cervelli](#)") Assistant Professor, Dept. of Biology, University of Padova. (2003 - 2007)

## **Highlights**

- Coordinator of the Marie-Sklodowska Curie RISE consortium "REFRACT" (2019-2023).
- Coordinator of the Marie-Sklodowska Curie RISE consortium "IDPfun" (2018-2022).
- Secretary of the National Scientific Qualification examination committee for Biochemistry (ASN 2018-2020).
- Deputy Head of Node for the Italian node of ELIXIR, the European infrastructure for biological data (since 2017).

- Chair (grant holder and proposer) of [COST Action BM1405 \(NGP-net\)](#) "Non-globular proteins: From sequence to structure, function and application in molecular physiopathology" (2015-2019).
- Journal Editor for:
  - [Current Protocols in Bioinformatics](#), Editorial Board since 2022.
  - [PLoS One](#) (Public Library of Science), Editor 2012 - 2019.
  - [Amino Acids](#) (Springer), Editor (Bioinformatics) since 2011.
  - [Frontiers in Bioinformatics and Computational Biology](#) (Frontiers Media), Review Editor since 2011.
  - [Biochimie](#) (Elsevier), since 2015
- Program committee member for conferences:
  - Intelligent Systems for Molecular Biology (ISMB) (since 2007)
  - European Conference on Computational Biology (ECCB) (since 2007)
  - International Conference on Bioinformatics (BIOINFORMATICS, part of BIOSTEC) (since 2009)
- Referee for grant proposals:
  - COST Association (since 2015)
  - Italian Ministry for University and Research (MIUR) grants, since: PRIN 2008, FIRB Futuro in Ricerca 2009 and FAR 2012.
  - Romanian National Council for Scientific Research grants, since 2011.
  - University of Trieste grants, since 2013.
  - ECOS-SUD Committee (Comité Evaluation - Orientation de la Coopération Scientifique, France), since 2013.
  - University of Insubria grants, since 2014
- Total funding received (since 2003) ca. **6,300,000** Euro.
  - *FIRB Futuro in Ricerca* (funding rate: ca. 1 out of 40)
  - *AIRC My First AIRC Grant*
  - *Ministero della Salute - Giovani Ricercatori* (funding rate: ca. 1 out of 10)
  - *MSCA RISE Consortium "IDPfun"* (Coordinator)
  - *MSCA RISE Consortium "REFRACT"* (Coordinator)
- Technology transfer:
  - Commercial software licensing to [Boehringer Ingelheim: PASTA](#) (2011).
  - Commercial software licensing to [MedImmune: PASTA, ESPRITZ](#), FESS (2015).
  - Commercial software licensing to [Sanofi: RING](#), RING-MD (2015).
- Bibliometric indices (Hirsch, 2005): **H-index = 35**, **M-index = 2.0**.
  - Total peer-reviewed papers 130+.
  - Total citations 4,300+.
  - Number of citations in most recent year 850+.
  - Total impact factor 600+, average impact factor >5.
  - First paper published in 2002.

## Additional

- Member of the Board of Directors for the [CRIBI Biotech Center](#), Uni Padova. (2014-2018)
- Member of the Board of Directors for the [PhD School in Biomedical Sciences](#), Uni Padova. (since 2014)
- Qualified for Full Professor in Biochemistry (National Scientific Qualification examination, ASN 2012).

- Qualified for Full Professor in Molecular Biology (National Scientific Qualification examination, ASN 2012).
- Member of the Board of Directors for the Uni Padova [Information Technology Service Center](#). (2012-2015)
- Member of the [Scientific Area Commission](#) in Biological Sciences (Uni Padova). (2008 - 2012)
- Chairman of the Information Technology Commission (Dept. of Biology, Uni Padova). (2008-2013)
- Organizer with Dr. Nevena Veljković of the [2nd NGP-net Symposium on non-globular proteins](#) (Belgrade, 14-18 September 2016).
- Organizer of the [NGP-net Winter School on computational methods for non-globular proteins](#) (Brixen, 15-19 February 2016).
- Organizer with Dr. Sandra Macedo-Ribeiro of the [1st NGP-net Symposium on non-globular proteins](#) (Porto, 6-9 October 2015).
- Organizer together with Prof. Giuseppe Zanotti of the PROTEINE2014 symposium for the [Italian Biochemical Society](#) (2014).
- Organizer (jointly with Prof. Flavio Seno, 2003-2005, Dr. Antonio Trovato and Prof. Roberto Battistutta, 2005-2009) of the monthly P2P seminar series and yearly symposium.
- Editorial board member for:
  - [Current Bioinformatics](#) (since 2006)
- Referee (30+ papers / year) for:
  - [Nature Communications](#)
  - [Chemical Society Reviews](#)
  - [Trends in Biochemical Sciences](#)
  - [Nucleic Acids Research](#)
  - [Genome Biology](#)
  - [PLoS Computational Biology](#)
  - [Biophysical Journal](#)
  - [Bioinformatics](#)
  - [Molecular BioSystems](#)
  - [Journal of Physical Chemistry](#)
  - [PLoS One](#)
  - [Journal of Molecular Biology](#)
  - [Amino Acids](#)
  - [Human Mutation](#)
  - [FEBS Letters](#)
  - [Langmuir](#)
  - [Journal of Applied Crystallography](#)
  - [Molecular Genetics and Genomics](#)
  - [Proteomics](#)
  - [Frontiers in Bioengineering](#)
  - [Biochimie](#)
  - [Scientific Reports](#)
  - [Annals of Human Genetics](#)
  - [BMC Evolutionary Biology](#)
  - [BMC Bioinformatics](#)
  - [Algorithms for Molecular Biology](#)
  - [BMC Structural Biology](#)
  - [FEBS Journal](#)
  - [Proteins](#)

- [Protein Science](#)
- [Protein Engineering Design & Selection](#)
- [Expert Reviews of Proteomics](#)
- [Journal of Computational Biology](#)
- [Journal of Chemical Information and Modeling](#)
- [Journal of Molecular Graphics and Modelling](#)
- [Journal of Molecular Modelling](#)
- [Omics](#)
- [Current Bioinformatics](#)
- [IEEE/ACM Transactions on Computational Biology and Bioinformatics](#)
- [Acta Chimica Slovenica](#)
- [International Journal of Biological Sciences](#)
- [Pacific Symposium on Biocomputing](#)
- [In Silico Biology](#)
- [Intrinsically Disordered Proteins](#)
- Author of numerous posters and conference abstracts.
- Speaker at numerous invited talks and seminars, including:
  - NGP-net Symposium (Druskininkai, Lithuania)
  - Belgrade Bioinformatics conference (Serbia)
  - Vrije Universiteit Brussel (Belgium)
  - Centre for Genomic Regulation (Barcelona, Spain)
  - NGP-net Symposium (Kosice, Slovakia)
  - NGP-net Symposium (Belgrade, Serbia)
  - European Bioinformatics Institute (Cambridge, UK)
  - NGP-net Symposium (Porto, Portugal)
  - Bologna Winter School on Bioinformatics (Italy)
  - Argentinean Conference on Bioinformatics (Argentina)
  - BITS - Italian Conference on Bioinformatics (several times, Italy)
  - University of Rome Tor Vergata (Italy)
  - University of Basel (Switzerland)
  - Max-Planck-Institut for Informatics (Saarbruecken, Germany)
  - Centro Nacional de Investigaciones Oncologicas (Madrid, Spain)
  - University College Dublin (Ireland)
  - University College London (UK)
  - University of Bayreuth (Germany)
  - University of Cologne (Germany)
  - University of Kiel (Germany)
  - University of Trento (Italy)
  - University of Udine (Italy)
  - University of Florence (Italy)
  - University of Rome La Sapienza (Italy)
- Attended **60+**, predominantly international, conferences and **6** summer schools & courses, including:
  - International Conference on Intelligent Systems for Molecular Biology (ISMB, several times)
  - European Conference on Computational Biology (ECCB, several times)
  - Critical Assessment of Genome Interpretation (CAGI)
  - Critical Assessment of techniques for protein Structure Prediction (CASP, several times)

- Research in Computational Biology (RECOMB)
- Bologna Winter School on Bioinformatics (several times)
- Lipari Summer School on Bioinformatics
- BITS - Italian Conference on Bioinformatics (several times)
- SIB - Italian Biochemistry Society conference
- Argentinean Conference on Bioinformatics
- Group leader in the worldwide [Critical Assessment of Function Annotation \(CAFA\)](#) experiment (since 2014).
  - Ranked in top 10 for molecular function, biological process and human phenome ontology predictions.
- Group leader in the worldwide [Critical Assessment of Genome Interpretation \(CAGI\)](#) experiment (since 2011).
  - Assessor for the P16 challenge (2013).
  - Top ranked for the Crohn's Disease challenge (2013).
  - Top ranked for the FCH/HA challenge (2013).
  - Ranked 2nd out of 33 for the Crohn's Disease challenge (2011).
- Group leader at the worldwide biannual [Critical Assessment of techniques for protein Structure Prediction \(CASP\)](#) experiment (since 2000):
  - Ranked 1st of 45 in CASP-8 model quality assessment category. (2008)
  - Ranked 1st of 16 in CAFASP-4 MQAP (model quality assessment program) category. (2004)
  - Ranked 2nd of 20 for disorder prediction and in top 5% for comparative modelling (easy) in CASP-6. (2004)
  - Ranked 1st of 38 for secondary structure prediction in CASP-5. (2002)
- Participated in
  - EMBO course Negotiation for scientists (2019).
  - [EMBO Laboratory Management Course](#) for independent group leaders (2011).

## Teaching activities

### Current:

- Titular of the "*Bioinformatica Strutturale*" course (48 hours of lectures, 16 hours of practicals, 16 hours of journal club, exams) in the second-level degree in Molecular Biology (Università di Padova). (since AA 2013/2014)
- Titular of the "*Bioinformatica II*" course (16 hours of lectures, 16 hours of practicals, exams) in the second-level degree in Computer Science (Università di Padova). (since AA 2014/15)
- Titular of the "*Bioinformatics and Computational Biology*" course (48 hours of lectures, 15 hours of practicals, 12 hours of journal club, exams) in the second-level degree in Pharmaceutical Biotechnology (Università di Padova). (since AA 2015/2016)

### Previous:

- Titular of the "*Bioinformatica*" course (40 hours of lectures, 8 hours of practicals, exams) in the second-level degree in Informatics (Università di Padova). (AA 2008/2009 - 2010/2011)
- Titular of the "*Bioinformatica Strutturale*" course (32 hours of lectures, exams) in the second-level degree in Molecular Biology (Università di Padova). (AA 2005/2006 - 2007/2008)

- Titular of the "*Domini Proteici*" course (16 hours of lectures, exams) in the second-level degree in Molecular Industrial Biotechnology (**Università di Verona**). (AA 2007/2008)
- Titular of the "*Genomica B*" course (40 hours of lectures, 32 hours of practicals, exams) in the second-level degree in Molecular Biology (Università di Padova). (AA 2003/2004, AA 2004/2005)
- Various (**7+**) short courses held from 2001 to 2004.
- Participation in a workshop (32 hours) on *university didactics*. (WS 2001/2002)
- Titular of the "*Bioinformatica I*" course (32 hours of lectures, 32 hours of practicals, exams) in the second-level degree in Evolutionary Biology (Università di Padova). (since AA 2007/2008)
- Titular of the "*Bioinformatica II*" course (32 hours of lectures, 16 hours of practicals, exams) in the first-level degree in Molecular Biology (Università di Padova). (since AA 2005/2006)

**Supervisor of:**

- **twenty** diploma theses,
- **twenty** undergraduate student projects,
- **five** graduate exchange students,
- **six** graduate collaborators,
- **seven** PhD students,
- **eight** PostDocs.