


PERSONAL INFORMATION

Nicola Crosetto, M.D., Ph.D.



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Sex Male | Date of birth 02/01/1978 | Nationality Italian

My primary research interest is in understanding how the nucleus of eukaryotic cells is spatially organized, and how the interplay between 3D genome dynamics and gene expression influences genome integrity. I am especially interested in understanding the role of genome fragility in cancer initiation and progression, and I aim to harness our knowledge of genome fragility to develop novel molecular tools for improved cancer diagnostics.

PERSONAL STATEMENT

With this application, I wish to spend a sabbatical period as visiting scientist in the laboratory of my close collaborators, Prof. Anna Sapino and Prof. Caterina Marchiò at the Candiolo Cancer Institute IRCCS and University of Torino. I have already successfully collaborated with both of them on different projects on the topic of breast cancer heterogeneity and molecular diagnostics, which is reflected in several joint publications highlighted below. Being a visiting scientist in their labs will allow us to further synergize our complementary expertise and promote scientific interactions between Karolinska Institute and the University of Torino.

WORK EXPERIENCE

- 2015 - present **Assistant Professor**
Science for Life Laboratory, Karolinska Institute, Stockholm, Sweden
- 2013-2014 **Postdoctoral Associate**
Van Oudenaarden lab, Hubrecht Institute, Utrecht, the Netherlands
- 2011-2013 **Postdoctoral Associate**
Van Oudenaarden lab, Massachusetts Institute of Technology, Cambridge MA, USA

EDUCATION AND TRAINING

- 2018 **Italian National Scientific Habilitation (ASN2016, settore 05/E3, I Fascia)**
- 2010 **Ph.D. degree in Bioengineering and Bioinformatics**
University of Pavia, Italy and Goethe Medical School, Frankfurt am Main, Germany
- 2007 **Specialization in Medical Oncology**
University of Turin, Italy
- 2003 **M.D. degree**
University of Pavia, Italy

PERSONAL SKILLS

Mother tongue Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
French	B2	B2	B2	B2	B1

Communication skills

- Regular speaker at national (Sweden) and international meetings
- Passionate science communicator for the general public

Organisational / managerial skills

- Currently supervising 4 postdocs, 3 PhD students, 1 technician, 3 master's students
- Previously supervised 4 master's students from Karolinska Institutet and 5 Erasmus students from Italy, Germany, Poland, and France
- Trained >30 students and postdocs from labs all over the world in methods developed in my lab: www.breakome.eu | www.hdfish.eu | www.fusefish.eu | www.tumorheterogeneity.eu

Driving licence

Italian driving licence B

ADDITIONAL INFORMATION

Ongoing collaborations

- Prof. Anna Sapino and Prof. Caterina Marchiò IRCC Candiolo, Turin, Italy (breast cancer heterogeneity and novel molecular diagnostics tools)
This application aims at continuing and further strengthening this successful ongoing collaboration
- Prof. Giuseppe Testa, IEO, Milan, Italy (DNA breaks in ovarian cancer)
- Prof. Colin Semple, University of Edinburgh, UK (DNA breaks and structural variation)
- Prof. Mats Nilsson, Stockholm University (novel in situ RNA detection methods)

Honours and awards

2009 Young researcher award, "C. Golgi" Foundation (Italy)
 2006 Young researcher award, "G. Costa" Association against cancer (Italy)
 2005 Short-term Research Grant Award (25,000 EUR), Collegio Ghislieri (Italy)
 2004 Best medical graduate award, Collegio Ghislieri, University of Pavia (Italy)

Patents

2015 "DNA Double-strand Breaks Labeling In Situ and Sequencing (BLISS) by Solid-phase Barcoding and Selective Amplification: Methods and Application", amendment to US Patent Application 62/094,093 (co-applicant with prof Feng Zhang, MIT)

Talks as Group Leader

Sep 2019 European Congress of Pathology, Nice, France (invited)
 Jun 2019 Nencki Institute for Neurobiology, Warsaw, Poland (invited)
 May 2019 Frankfurt Cancer Institute, Frankfurt, Germany (invited)
 Jan 2019 Uppsala University (invited by Prof. O. Soderberg.)
 Nov 2018 Jagiellonian University, Krakow, Poland (invited)
 Jun 2018 OEI Oncology Days 2018, Poznan, Poland (invited)
 May 2018 GAP Conference 2018, Karolinska Institutet (selected)
 Mar 2018 Advanced Seminars in Tumor and Cell Biology, Karolinska Institutet (invited)
 Dec 2017 **IRCC Candiolo, Turin, Italy (invited by Prof. Anna Sapino)**
 Dec 2017 Clinical Genetics Friday Talks, Karolinska Institutet (invited)
 Nov 2017 Oncology-Pathology Friday Talks, Karolinska Institutet (invited)
 Oct 2017 DNA repair Mini-Symposium, Karolinska Institutet (invited)
 Oct 2017 Bertinoro Computational Biology Meeting, Bertinoro, Italy (invited)
 Sep 2017 KI-StratCan Cancer Retreat 2017, Djurönäset (Stockholm), Sweden (selected)
 Sep 2017 European Congress of Pathology, Amsterdam, The Netherlands (invited)
 Jun 2017 SciLifeLab Fellows retreat, Djurönäset, Sweden (invited)

	Dec 2016	Frontiers in Translational Medicine course, Karolinska Institutet (invited)
	Oct 2016	Seminars in Biochemistry, Stockholm University (invited)
	Oct 2016	Symposium for PhD students and Postdocs, Karolinska Institutet (invited)
	Oct 2016	The Cell Cycle course, Karolinska Institutet (co-organizer)
	Jun 2016	Prof Rolf Lewensohn group, Oncology-Pathology, Karolinska Institutet (invited)
	May 2016	Genome Instability and Human Disease course, Institut Curie, France (invited)
	May 2016	Genome Engineering 4.0 workshop, Broad Institute, USA (invited)
	Apr 2016	Prof Steven Bova group, Tampere University, Finland (invited)
	Feb 2016	Frontiers in Cancer Research and Therapy, Karolinska Institutet (invited)
	Nov 2015	The Cell Cycle course, Karolinska Institutet (invited)
	Nov 2015	IMB, Mainz, Germany (invited)
	Sep 2015	11 th World Urological Research Congress, Nijmegen, The Netherlands (invited)
	Sep 2015	Emerging Methods and Technologies conference, Karolinska Institutet (selected)
	Jun 2015	WITE Conference 2015, Würzburg, Germany (invited)
	Jun 2015	MTC lunch seminars, Karolinska Institutet (invited)
	May 2015	DNA Sequencing and Basic Bioinformatics course, Karolinska Institutet (invited)
	May 2015	IFOM-IEO seminars, Milan, Italy (invited)
	Apr 2015	GAP Conference 2015, MD Anderson Cancer Center (selected)
	Feb 2015	MBB lunch seminars, Karolinska Institutet (invited)
Courses	May 2019	'The Era of "-Seq" Methods', Krakow, Poland (organizer)
	Nov 2018	'Next-generation FISH technologies', Krakow, Poland (organizer)
	Mar 2017	EMBO Lab Management Course Leadership, Uppsala, Sweden (attendee)
	Fall 2016	Pedagogy Course for Doctoral Supervisors, Karolinska Institutet (attendee)
	2015-present	Biochemistry for medical students, MBB, Karolinska Institutet (teacher)
Positions of trust	2018-2019	Associate Editor, <i>BMC Genomics</i>
	2015, 2018	Reviewer, <i>European Research Area Network</i>
	Jun 2017	Committee member, PhD half-time review Benedekt Bokozy, Karolinska Institutet
	Jan 2017	Chairman, PhD thesis defense Alan Shaw, MBB, Karolinska Institutet
	Jun 2016	Examiner, Junior Research Projects, Master in Biomedicine, Karolinska Institutet
	2016-present	PhD Admission Committee, MBB, Karolinska Institutet
	2015-2017	Executive Committee, Division of Translational Medicine, Karolinska Institutet
	2015-present	Member, <i>Personalized Cancer Medicine</i> (PCM) program, Karolinska Institutet
	2014-present	Reviewer, <i>Nature Biotechnology</i> , <i>Nature Communications</i> , <i>Nature Protocols</i> , <i>Nucleic Acids Research</i> , <i>Genome Research</i> , <i>Oncotarget</i> , <i>BMC Genomics</i> , <i>JoVE</i> , <i>Proceedings of the IEEE</i> , <i>PLoS One</i> , <i>FEBS J</i> , <i>Scientific Reports</i>
Ongoing research grants	2018-2021	Ragnar Söderberg Fellows in Medicine 2016 Project title: "High-dimensional anatomy of intra-tumor heterogeneity" Sum: 8,000,000 SEK (~765,000 EUR)
	2017-2022	Swedish Foundation for Strategic Research (SSF) Project title: "Integrated visualization of intra-tumor heterogeneity" Sum: 33,000,000 SEK (~3,155,000 EUR)
	2018-2020	KID2016 (Karolinska Institutet) Project title: "Molecular characterization of activity-induced DNA double-strand breaks in neurons" Sum: 1,200,000 SEK (~114,000 EUR)
	2019-2020	Karolinska Institutet 2-year extension of current position as Assistant Professor (Forskarassistent) Sum: 2,000,000 SEK (~191,000 EUR)
	2018-2022	Karolinska Institutet Strategic Research Programme in Cancer (StratCan) Senior Researcher in Cancer Research Project title: "Illuminating cancer genomic fragility by integrated omics" Sum: 7,500,000 SEK (~717,000 EUR)
	2019-2022	Swedish Research Council (VR) Project title: "Deciphering the role of programmed DNA breaks in aging" Sum: 7,200,000 SEK (~688,000 EUR)
	2019-2021	Swedish Cancer Society (Cancerfonden) Project title: "Charting the Cancer Breakome and its Clinical Implications" Sum: 2,400,000 SEK (~229,000 EUR)

Completed research grants	2015-2018	Karolinska Institutet Strategic recruitment of junior group leaders (Forskarassistent) Sum: 4,000,000 SEK (~382,000 EUR)
	2015-2018	Swedish Research Council (VR) Project title: "Advancing personalized oncology with quantitative single-cell technologies to measure tumor heterogeneity" Sum: 6,000,000 SEK (~574,000 EUR)
	2016-2018	Swedish Cancer Society (Cancerfonden) Project title: "Unraveling the clinical impact of intra-tumor heterogeneity by multi-regional omics and single-cell technologies" Sum: 1,800,000 SEK (~172,000 EUR)

Bibliometric index
Source: Google Scholar
Last update: 12 June 2019

- Publications listed in PubMed: **44** (of which **34** original articles)
- Book chapters and peer-reviewed posters: **3**
- H-index: **26**
- i-10 index: **33**
- Citations: **3,161**

10 most important publications
(chronological order)

1. Bienko M, **Crosetto N**, Teytelman L, Klemm S, Itzkovitz S, van Oudenaarden A. A versatile genome-scale PCR-based pipeline for high-definition DNA FISH. **Nat Methods**. 2013 Feb;10(2):122-4. doi: 10.1038/nmeth.2306. Epub 2012 Dec 23. PMID: 23263692. *Equally contributing first author*
2. **Crosetto N**, Mitra A, Silva MJ, Bienko M, Dojer N, Wang Q, Karaca E, Chiarle R, Skrzypczak M, Ginalski K, Pasero P, Rowicka M, Dikic I. Nucleotide-resolution DNA double-strand break mapping by next-generation sequencing. **Nat Methods**. 2013 Apr;10(4):361-5. doi: 10.1038/nmeth.2408. Epub 2013 Mar 17. PMID: 23503052. *Co-corresponding author*
3. Semrau S, **Crosetto N**, Bienko M, Boni M, Bernasconi P, Chiarle R, van Oudenaarden A. FuseFISH: robust detection of transcribed gene fusions in single cells. **Cell Rep**. 2014 Jan 16;6(1):18-23. doi: 10.1016/j.celrep.2013.12.002. Epub 2013 Dec 27. PMID: 24373969. *Equally contributing first author*
4. Annaratone L, Simonetti M, Wernersson E, Marchiò C, Scalzo M, Bienko M, Chiarle R, Sapino A, **Crosetto N**. Quantification of HER2 and estrogen receptor heterogeneity in breast cancer by single-molecule RNA fluorescence *in situ* hybridization. **Oncotarget**. 2017 Mar 21;8(12):18680-18698. doi: 10.18632/oncotarget.15727. PMID: 28423635. *Senior author*
This publication was done in collaboration with Profs. Anna Sapino and Caterina Marchiò, who provided relevant breast cancer samples and clinical data.
5. Yan WX, Mirzazadeh R, Garnerone S, Scott D, Schneider MW, Kallas T, Custodio J, Wernersson E, Li Y, Gao L, Federova Y, Zetsche B, Zhang F, Bienko M, **Crosetto N**. BLISS is a versatile and quantitative method for genome-wide profiling of DNA double-strand breaks. **Nat Commun**. 2017 May 12;8:15058. doi: 10.1038/ncomms15058. PMID: 28497783. *Senior author*
6. Kim C, Gao R, Sei E, Brandt R, Hartman J, Hatschek T, **Crosetto N**, Foukakis T, Navin NE. Adaptive Chemoresistance Evolution in Triple-Negative Breast Cancer Delineated by Single-Cell Sequencing. **Cell**. 2018 Apr 13. pii: S0092-8674(18)30365-9. doi: 10.1016/j.cell.2018.03.041. [Epub ahead of print]. PMID: 29681456
7. Wu C, Simonetti M, Rossell C, Mignardi M, Mirzazadeh R, Annaratone L, Marchiò C, Sapino A, Bienko M, **Crosetto N**, Nilsson M. RollFISH achieves robust quantification of single-molecule RNA biomarkers in paraffin-embedded tumor tissue samples. **Commun Biol**. 2018 Nov 28;1:209. doi: 10.1038/s42003-018-0218-0. eCollection 2018. PMID: 30511022. *Senior co-author*
This publication was done in collaboration with Profs. Anna Sapino and Caterina Marchiò, who provided relevant breast cancer samples and clinical data.

8. Gelali E, Girelli G, Matsumoto M, Wernersson E, Custodio J, Mota A, Schweitzer M, Ferenc K, Li X, Mirzazadeh R, Agostini F, Schell JP, Lanner F, **Crosetto N**, Bienko M. Gelali E, Girelli G, Matsumoto M, Wernersson E, Custodio J, Mota A, Schweitzer M, Ferenc K, Li X, Mirzazadeh R, Agostini F, Schell JP, Lanner F, Crosetto N, Bienko M. iFISH is a publically available resource enabling versatile DNA FISH to study genome architecture. *Nat Commun.* 2019 Apr 9;10(1):1636. doi: 10.1038/s41467-019-09616-w. PMID: 30967549
Senior co-author
9. Dellino GI, Palluzzi F, Chiariello AM, Piccioni R, Bianco S, Furia L, De Conti G, Bouwman BAM, Melloni G, Guido D, Giacobbe L, Luzi L, Cittaro D, Faretta M, Nicodemi M, **Crosetto N** and Pelicci PG. Release of paused RNA-Polymerase II at specific loci favors DNA double strand break formation and promotes cancer translocations. *Nat Genet.* 2019 May 20. doi: 10.1038/s41588-019-0421-z. [Epub ahead of print]. PMID: 31110352
10. Gothe HJ, Bouwman BAM, Gusmao EG, Piccinno R, Petrosino G, Sayols S, Drechsel O, Minneker V, Josipovic N, Mizi A, Nielsen CF, Wagner EM, Takeda S, Sasanuma H, Hudson DF, Kindler T, Baranello L, Papantonis A, **Crosetto N**, Roukos V. Spatial Chromosome Folding and Active Transcription Drive DNA Fragility and Formation of Oncogenic MLL Translocations. *Mol Cell.* 2019 Jun 5. pii: S1097-2765(19)30387-9. doi: 10.1016/j.molcel.2019.05.015. [Epub ahead of print]. PMID: 31202576