

Anders Sejr Hansen

K99 Pathway to Independence Postdoctoral Fellow
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Education

PhD and AM, Chemistry and Chemical Biology, Harvard University 2010-15
MChem, Master's and undergraduate degrees in Chemistry, Oxford University, UK 2006-10

Research

Post-doctoral research: Molecular and Cell Biology & Biophysics, UC Berkeley 2015-present
Regulation of 3D genome organization by CTCF and cohesin. Advisors: Robert Tjian and Xavier Darzacq

Graduate research: Systems Biology & Chemistry, Harvard University 2011-15
Information transduction through regulation of transcription factor dynamics. Advisor: Erin O'Shea

Master's and prior research: Synthetic Organic Chemistry, Oxford University and Harvard University 2008-10
Synthesis of 5hmC phosphoramidites (Advisor: Chris Schofield, Oxford);
Macrocyclic ring-closing metathesis (Advisor: Stuart Schreiber, Harvard)

Honors (selected)

K99/R00 Pathway to Independence (NIGMS K99GM130896) 2019-2023
Siebel Post-doctoral Fellowship, Siebel Foundation 2016-18
Best talk award (MCB/GGD Retreat) UC Berkeley 2018
Derek Bok Certificate of Distinction in Teaching, Harvard University (Q-score: 4.8/5.0) 2012
Top of class (highest ranked student out of 152 students), Oxford University 2010
Gibbs Prize (best performance in Part 1B exams out of 154 students), Oxford University 2009
Evonik Degussa Prize (best performance in Part 1A exams out of 156 students), Oxford University 2008
Casberd Scholarship, St John's College, Oxford University 2007
Distinctions, Preliminary Exams, Quantum Chemistry, Aromatic & Heterocyclic Chemistry 2007-09
Glaxo-Smith-Kline Organic Chemistry Bursary 2006-10
Prince Joachim's and Princess Alexandra's Foundation Award, Royal Danish Monarchy 2006

Academic Talks (selected)

MCB/GGD Retreat (internally invited talk), Asilomar, CA 2018
Symposium on Organoid Self-Organization (invited talk), MPI-CBG & CSBD, Dresden, Germany 2018
Single Biomolecules (abstract selected for talk), Cold Spring Harbor Lab Meeting, NY 2018
Biophysics of Nuclear Organization and Function (invited talk), Berkeley, CA 2018
Nuclear Organization and Function (abstract selected for talk), Cold Spring Harbor Lab Meeting, NY 2018
4D Nucleome Annual Meeting (abstract selected for talk), Bethesda, MD 2017
MCB Retreat (internally invited talk), UC Berkeley, Lake Tahoe, CA 2017
Biophysics of Nuclear Organization and Function (invited talk), Berkeley, CA 2017
Joint UCSC-UCSF-UCB Stem Cell Meeting (internally invited talk), Asilomar, CA 2017
4D Nucleome Webinar (invited talk) 2017
Systems Biology (abstract selected for talk), Cold Spring Harbor Lab Meeting, NY 2017
March Meeting (One of two invited session keynotes), American Physical Society, New Orleans, LA 2017
Siebel Stem Cell Meeting of Stanford-UCB-UCSF (internally invited talk), Berkeley, CA 2017
4D Nucleome Center Meeting (invited talk), MIT, Cambridge, MA 2017
Winter q-bio Conference (abstract selected for talk), HI 2014
Transcription Imaging Consortium (invited talk), Janelia Farm, VA 2014
Departmental Student Talk (internally invited talk), Harvard Chemistry, Cambridge, MA 2013

Teaching and Mentoring Experience

Mentoring, 1 undergraduate and 1 graduate rotation student, UC Berkeley 2016-18
Mentoring, 1 undergraduate and 3 graduate rotation students, Harvard University 2012-14
Teaching Fellow (section and labs), LS1a (Life Sciences); Chem27 (Organic Chemistry), Harvard University 2011

Service

Referee, *PLoS Genetics*, *Journal of Theoretical Biology*, *BMC Genomics*, *EPJ Soft Matter* 2016-present
4D Nucleome Imaging Workgroup: lead development of standardized SPT format ([code](#)) 2017-present

First-author / Senior-author Publications and Preprints

(+ indicates corresponding author and * indicates co-first author; [ORCID ID](#): 0000-0001-7540-7858). Please click on [journal](#) to be re-directed to article at journal website. 23 in total.

- 1 **Hansen AS***, Hsieh THS*, Cattoglio C*, Pustova I, Darzacq X, Tjian R. An RNA-binding region in CTCF regulates clustering and chromatin looping. *BioRxiv*. 2018. DOI: 10.1101/495432
- 2 **Hansen AS***, Amitai A*, Cattoglio C, Tjian R, Darzacq X. Guided nuclear exploration increases CTCF target search efficiency. *BioRxiv*. 2018. DOI: 10.1101/495457
- 3 Cattoglio C, Pustova I, Ho JC, Inouye CJ, Dailey GM, Darzacq X, Tjian R, **Hansen AS⁺**. Architectural features of 3D genome organization revealed by counting CTCF and cohesin molecules. *BioRxiv*. 2018. DOI: 10.1101/370650 (accepted for publication at *Elife*)
- 4 **Hansen AS****, Woringer M*. Grimm JB, Lavis LD, Tjian R, Darzacq X. Robust model-based analysis of single-particle tracking experiments with Spot-On. *Elife*. 2018. DOI: 10.7554/eLife.33125
- 5 **Hansen AS⁺**, Cattoglio C, Darzacq X, Tjian R. Recent evidence that TADs and chromatin loops are dynamic structures. *Nucleus*. 2017. DOI: 10.1080/19491034.2017.1389365
- 6 **Hansen AS**, Pustova I, Cattoglio C, Tjian R, Darzacq X. CTCF and Cohesin Regulate Chromatin Loop Stability with Distinct Dynamics. *Elife*. 2017. DOI: 10.7554/eLife.25776
- 7 **Hansen AS**, O'Shea EK. Encoding four gene expression programs in the activation dynamics of a single transcription factor. *Current Biology*. 2016. 26(7), R269-271
- 8 **Hansen AS**, O'Shea EK. *Cis*-determinants of promoter threshold and activation timescale. *Cell Reports*. 2015, 12(8), 1226-1233.
- 9 **Hansen AS**, Hao N, O'Shea EK. High-throughput microfluidics to control and measure signaling dynamics in single yeast cells. *Nature Protocols*. 2015. 10(8), 1181-1197.
- 10 **Hansen AS**, O'Shea EK. Limits on information transduction through amplitude and frequency regulation of transcription factor activity. *Elife*. 2015 DOI: 10.7554/eLife.06559
- 11 **Hansen AS**, O'Shea EK. Promoter decoding of transcription factor dynamics involves a trade-off between noise and control of gene expression. *Molecular Systems Biology*. 2013. DOI 10.1038/msb.2013.56
- 12 **Hansen AS**, Thalhammer A, El-Sagheer AH, Brown T, Schofield CJ. Improved synthesis of 5-hydroxymethyl-2'-deoxycytidine phosphoramidite using a 2'-deoxyuridine to 2'-deoxycytidine conversion without temporary protecting groups. *Bioorganic and Medicinal Chemistry Letters*. 2011. 21, 1181-4.

Collaborative Publications and Preprints

- 13 Xie L, Dong P, Qi Y, De Marzio M, Chen X, Banala S, Legant WR, English B, **Hansen AS**, Schulmann A, Lavis LD, Betzig E, Chang HY, Zhang B, Tjian R, Liu Z. Super-resolution imaging of 3D accessible genome organization and function. (*under review*).
- 14 Oomen ME, **Hansen AS**, Liu Y, Darzacq X, Dekker J. CTCF sites display cell cycle dependent dynamics in factor binding and nucleosome positioning. *Genome Research*. 2019. DOI: 10.1101/gr.241547.118
- 15 McSwiggen DT, **Hansen AS**, Marie-Nelly H, Teves SS, Heckert A, Dugast-Darzacq C, Hao Y, Umemoto K, Tjian R, Darzacq X. Transient DNA binding induces RNA Polymerase II compartmentalization during Herpesviral infection distinct from phase separation. *BioRxiv* DOI: 10.1101/375071 (invited revision at *Cell*)
- 16 Boehning M*, Dugast-Darzacq C*, Rankovic M*, **Hansen AS**, Yu T, Marie-Nelly H, Kokic G, Dailey GM, Cramer P, Darzacq X, Zweckstetter M. RNA Polymerase II clustering through CTD phase separation. *Nature Structural and Molecular Biology*. 2018. DOI: 10.1101/316372;
- 17 Lu H, Yu D, **Hansen AS**, Ganguly S, Liu R, Heckert A, Darzacq X, Zhou Q. Phase-separation mechanism for C-terminal hyperphosphorylation of RNA polymerase II. *Nature*. 2018. 558. p318-325
- 18 Mir M, Reimer A, Stadler M, Tangara A, **Hansen AS**, Hockemeyer D, Eisen MB, Garcia H, Darzacq X. Single molecule imaging in live embryos using lattice light-sheet microscopy. *Nanoscale Imaging*. 2018.
- 19 Dekker, J., *et al.*, The 4D nucleome project. *Nature*. 2017. 549 (7684), p219-226.
- 20 Teves SS, An L, **Hansen AS**, Xie L, Darzacq X, Tjian R. A dynamic mode of mitotic bookmarking by transcription factors. *Elife*. 2016. DOI: 10.7554/eLife.22280
- 21 Huang L, Pauleve L, Zechner C, Unger M, **Hansen AS**, Koepl H. Reconstructing dynamic molecular states from single-cell time series. *Journal of The Royal Society Interface*. 2016, 13(122).
- 22 Wang Y, Jimenez M, **Hansen AS**, Raiber EA, Schreiber SL, Young DW. Control of olefin geometry in macrocyclic ring-closing metathesis using a removable silyl group. *Journal of the American Chemical Society*. 2011. 133, 9196-9.
- 23 Thalhammer A, **Hansen AS**, El-Sagheer AH, Brown T, Schofield CJ. Hydroxylation of methylated CpG dinucleotides reverses stabilisation of DNA duplexes by cytosine 5-methylation. *Chemical Communications*. 2011. 47, 5325-7.