

**Erasmus University Rotterdam, the Netherlands**  
**CSC PhD 2015 Project Description**

<b>School/Department:</b>	Genetics
<b>Project Title:</b>	<b>Chromatin remodeling in Nucleotide Excision Repair</b>
<b>Abstract:</b>	<p>Genome integrity is vital for proper cell function, but is continuously challenged by the induction of DNA damage that interferes with transcription and replication. Nucleotide Excision Repair (NER) is a major DNA repair pathway that removes many different types of helix-distorting DNA lesions. Its medical relevance is illustrated by the severe photosensitivity, cancer predisposition and premature ageing associated with inherited mutations in NER genes. The NER mechanism consists of several enzymatic steps: (1) damage detection, (2) lesion verification (3), lesion removal and (4) gap filling. Although the basic molecular machinery is known in detail, it is not fully understood how NER functions <i>in vivo</i>, in particular in different chromatin environments of the genome.</p> <p>The chromatin structure plays an important regulatory role in NER by facilitating access to DNA, efficient recruitment of repair factors and DNA damage signaling. However, many of the proteins involved in NER-related chromatin modifications are still unknown. Therefore, we pursue a multi-disciplinary approach, using genetic screening, different DNA repair assays, live cell confocal imaging and quantitative proteomics, to detect and functionally characterize new chromatin proteins and chromatin changes that regulate NER. The results of this ambitious project will help to better understand how genome integrity is protected in the living cell.</p> <p>Our laboratory offers excellent training and supervision, in an international work environment, for young scientists that want to become independent researchers and experienced in the newest developments within the field of cell biology and genetics.</p>
<b>Requirements of candidate:</b>	<p><b>Background:</b> The candidate should have thorough knowledge of molecular and cellular biology. Experience in live cell imaging and image analysis is an advantage, but not mandatory.</p> <p><b>Master degree:</b> Yes</p> <p>IELTS Grade: 7.0 (<i>minimal 6.0 per component</i>)  or  TOEFL: 100 (<i>minimal 20 per component</i>)</p>

<p><b>Supervisor information:</b></p>	<p><b>Supervisors</b> Dr. H. Lans <a href="mailto:w.lans@erasmusmc.nl">w.lans@erasmusmc.nl</a> Prof.dr. W. Vermeulen <a href="mailto:w.vermeulen@erasmusmc.nl">w.vermeulen@erasmusmc.nl</a></p> <p><b>Personal website:</b> <a href="http://www.vermeulenlab.com">www.vermeulenlab.com</a></p> <p><b>Selected recent publications relevant for this project:</b></p> <p>Aydin OZ, Marteiijn JA, Ribeiro-Silva C, Rodríguez López A, Wijgers N, Smeenk G, van Attikum H, Poot RA, Vermeulen W, Lans H (2014) <i>Human ISWI complexes are targeted by SMARCA5 ATPase and SLIDE domains to help resolve lesion-stalled transcription</i> <b>Nucleic Acids Res</b> 42: 8473-85</p> <p>Marteijn JA, Lans H, Vermeulen W, Hoeijmakers JH (2014) <i>Understanding nucleotide excision repair and its roles in cancer and ageing</i> <b>Nature Reviews Mol Cell Biol</b> 15: 465-81</p> <p>Dinant C, Ampatzidis-Michailidis G, Lans H, Tresini M, Theil AF, van Cappellen WA, Kimura H, Bartek J, Fousteri M, Houtsmuller BA, Vermeulen W and Marteiijn JA (2013) <i>Enhanced chromatin dynamics by FACT promotes transcriptional restart after UV-induced DNA damage</i> <b>Molecular Cell</b> 51:469-79</p> <p>Lans H, Marteiijn JA, and Vermeulen W (2012) <i>ATP-dependent chromatin remodeling in the DNA-damage response</i> <b>Epigenetics &amp; Chromatin</b> 5:4</p> <p>Lans H, Marteiijn JA, Schumacher B, Hoeijmakers JH, Jansen G and Vermeulen W (2010) <i>Involvement of global genome repair, transcription coupled repair, and chromatin remodeling in UV DNA damage response changes during development</i> <b>PLoS Genetics</b> e1000941</p> <p>Luijsterburg MS, Dinant C, Lans H, Stap J, Wiernasz E, Lagerwerf S, Warmerdam DO, Lindh M, Brink MC, Dobrucki JW, Aten JA, Fousteri MI, Jansen G, Dantuma NP, Vermeulen W, Mullenders LH, Houtsmuller AB, Verschure PJ, van Driel R (2009) <i>Heterochromatin protein 1 is recruited to various types of DNA damage</i> <b>J Cell Biology</b> 185:577-86</p> <p><b>Selected other recent publications from the lab:</b></p> <p>Lans H, Lindvall JM, Thijssen K, Karambelas AE, Cupac D, Fensgård Ø, Jansen G, Hoeijmakers JH, Nilsen H and Vermeulen W (2013) <b>Cell Death &amp; Differentiation</b> 20: 1709-1718</p> <p>Vermeulen W and Fousteri M (2013) <b>Cold Spring Harb Perspect Biol</b> 5:a012625</p>
---------------------------------------	--

**Erasmus University Rotterdam, the Netherlands**  
**CSC PhD 2015 Project Description**

	<p>Lans H, Hoeijmakers JH (2013) <b>Nature Genetics</b> 44:836-8</p> <p>Theil AF, Nonnekens J, Steurer B, Mari PO, de Wit J, Lemaitre C, Martijn JA, Raams A, Maas A, Vermeij M, Essers J, Hoeijmakers JH, Giglia-Mari G and Vermeulen W. (2013) <b>PLoS Genetics</b> 9:e1003431</p> <p>Menoni H, Hoeijmakers JH and Vermeulen W (2012) <b>J Cell Biology</b> 199: 1037-46</p> <p>Mattioli F, Vissers JH, van Dijk WJ, Ikpa P, Citterio E, Vermeulen W, Martijn JA and Sixma, TK (2012) <b>Cell</b> 150: 1182-1195</p> <p>Bergink S, Toussaint W, Luijsterburg MS, Dinant C, Alekseev S, Hoeijmakers JH, Dantuma NP, Houtsmuller AB and Vermeulen W (2012) <b>J Cell Biology</b> 196: 681-688</p> <p>Schwertman P, Lagarou A, Dekkers DH, Raams A, van der Hoek AC, Laffeber C, Hoeijmakers JH, Demmers JA, Foustier M, Vermeulen W and Martijn JA (2012) <b>Nature Genetics</b> 44: 598-602</p> <p>Vermeulen W (2011) <b>DNA Repair</b> 10:760-71.</p> <p>Giglia-Mari G, Zotter A and Vermeulen W (2011) <b>Cold Spring Harb Perspect Biol</b> 3:a000745</p> <p>Giglia-Mari G, Theil AF, Mari, PO, Mourgues S, Nonnekens J, Andrieux L, de Wit J, Miquel C, Wijgers N, Maas A, Foustier MF, Hoeijmakers JH, and Vermeulen W (2009) <b>PLoS Biology</b> 7:e1000220</p> <p>Martijn JA, Bekker-Jensen S, Mailand N, Lans H, Schwertman P, Gourdin AM, Dantuma NP, Lukas J, and Vermeulen W (2009) <b>J Cell Biology</b> 186: 834-847</p>