

## CURRICULUM VITAE

### PERSONAL INFORMATION

Name: Heidi Lyng

Date of birth: 12.10.1960

Civil status: Married, three children

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### CURRENT AND PREVIOUS POSITIONS

2019-present Professor II (20% position), Dept of Physics, University of Oslo (UiO)

2012-present Group leader, Dept Radiation Biology, Oslo University Hospital (OUH)-Radiumhospitalet

2001-2012 Project group leader, Dept of Radiation Biology, OUH-Radiumhospitalet

1998 Scientist, Dept of Radiation Biology, OUH-Radiumhospitalet

1986-1998 PhD and postdoc position, Dept of Radiation Biology, OUH-Radiumhospitalet

### EDUCATION

1993 PhD (dr philos) in Biophysics, Faculty of Mathematics and Natural Science, UiO

1986 Master of Science (Sivilingeniør), Biophysics and Medical Technology, Faculty of Physics and Mathematics, The Norwegian Institute of Technology (NTH)

### RELEVANT TEACHING

2019-present FYS3700/4700 bachelor/master course in *Biophys Med Phys*, organizer (since 2022) and 20 lectures per year, UiO

2019-present FYS4720 master course in *Cellular radiobiology*, 20 lectures per year, UiO

2004-present *Radiation biology* course in the educational programme of specialization for oncologists, organizer of the course and 5 lectures per year, OUH

2004-present *Radiation physics, biology and health care in nuclear medicine* course in the educational programme of specialization for oncologists, 1 lecture per year, OUH

### SUPERVISION OF GRADUATE STUDENTS AND RESEARCH FELLOWS (main supervisor)

2001-present 16 master students, UiO, NMBU

2007-present 9 PhD students (5 completed, 3 ongoing), UiO, University in Tromsø

2012-present 6 postdocs (completed), OUH

### SUPERVISION OF PHD STUDENTS (main supervisor, completed)

2011 Malin Lando: *Genetic alterations in cervical cancer: consequences for gene regulation and clinical outcome after chemoradiotherapy*

2012 Kristin Snipstad: *Potential biomarkers of cancer in the pelvis. A microarray based study on patients treated with chemoradiotherapy*

2012 Cathinka H. Julin: *Biomarkers in chemoradiotherapy of cervical cancer: focus on EGFR and DCE-MR imaging*

2014 Harald B. Ragnum: *Hypoxia in prostate cancer: gene expression profiling in relation to disease aggressiveness and treatment intervention*

2017 Marte Jonsson: *Hypoxia-induced aggressiveness in cervical and prostate cancer with special emphasis on gene regulation, metabolism and biomarkers*

### FELLOWSHIPS AND GRANTS (last 5 years, role PI)

2022-2025 South Eastern Norway Regional Health Authority (HSØ): *Radiogenomics – non-invasive, actionable biomarkers for aggressive disease in prostate cancer patients*

2020-2022 HSØ: *Characterization of the tumor microenvironment for improved risk classification of prostate cancer patients*, PhD

2018-2020 HSØ: Regional research network in radiation oncology (NIRO)

2017-2020 Norwegian Cancer Society: *Molecular biomarkers in radiotherapy of cancer*, 8.6 mill

2016-2018 HSØ: *Tumor and circulating miRNAs as hypoxia biomarkers in prostate cancer*, PhD

2016-2018 Norwegian Cancer Society: *Molecular biomarkers in radiotherapy of cancer*, Technician

## **ORGANIZATION OF INTERNATIONAL CONFERENCES IN THE FIELD**

- 2020, 2023 Organizing chair of radiobiology track, Int conference for the European Society of Radiother Oncol (ESTRO), ESTRO2020; Co-organizing chair for ESTRO2023
- 2016-present Member of the ESTRO Radiobiology scientific advisory group for the international ESTRO35, ESTRO37, ESTRO38, ESTRO2020 (leader), ESTRO2021 conferences
- 2022 Co-organizer of Norwegian Cancer Symposium 2022: *Sustainable cancer care using molecular tests*, focus on prostate cancer (int symposium; [www.norprost.no](http://www.norprost.no)).

## **PRIZES AND AWARDS**

- 2019 Poster prize at 16<sup>th</sup> Int Conf Rad Res, UK: *Tumor infiltrating immune and stromal cells are associated with aggressiveness and cell proliferation in prostate cancer*; senior author
- 2018 and 2016 Excellent Paper Award at OUH, selected among about 2000 scientific papers from OUH, senior/corresponding author (*Hompland Cancer Res* 2018; *Fjeldbo Clin Cancer Res* 2016)
- 2015 Innovator of the month March, HSØ
- 2012 Research project of the month September, Norwegian Cancer Society
- 2010 Dr. Ragnar Mørk Legacy Prize in Cancer Research, OUH

## **INSTITUTIONAL RESPONSIBILITY (ongoing)**

- 2021-present Member of committee to formalize OUH-UiO collaboration on proton therapy
- 2017-present Institute representative, establishment of proton therapy research in Oslo, OUH

## **COMMISSIONS OF TRUST (last 5 years)**

- 2021-present Leader of the Radiobiology Committee in ESTRO, member since 2018
- 2018-present Leader of HSØ Research Network in Radiation Oncology ([www.niro-research.no](http://www.niro-research.no))
- 2006-present Opponent of 10 dissertations: University of Umeå, Sweden 2022; University of Manchester, UK 2020; VUMC, Amsterdam, The Netherlands 2020; Norwegian University of Science and Technology (NTNU) 2006, 2009; UiO 2011, 2011; University in Bergen 2013, 2017, 2022
- 1994-present Censor of 29 Master theses: Princess Margaret Cancer Center, Toronto, Canada; UiO (6x); NTNU (20x); Norwegian University of Life Sciences (2x)
- 2017-present Research grant evaluator: Swedish Cancer Society (Cancerfonden) 2021 and 2022; Dutch Cancer Society 2021; The Hanarth Fonds, The Netherlands 2021; Breast Cancer Now, UK 2021; Research projects HSØ 2020, 2021; Prostate Cancer UK 2017
- 2020 Evaluation committee for professorship at the Danish Center for Particle Therapy, Aarhus University Hospital, Denmark
- 1993-present Regular referee work of more than 10 international journals, incl Nature Reviews Cancer

## **INVITED SPEAKER AT INTERNATIONAL CONFERENCES (last 5 years)**

- 2022 41st ESTRO congress, Denmark. *How can omics lead to personalized radiation oncology?*
- 2019 16<sup>th</sup> Int Cong Rad Res (ICRR), UK. *Hypoxia biomarkers – genomics, imaging or both?*
- 2018 ESTRO37, Spain. *Genomic biomarkers for selection of patients to hypoxia modification*
- 2017 43<sup>rd</sup> ERRS - 20<sup>th</sup> GBS, Germany. *Imaging hypoxia in prostate cancer*
- 2016 62<sup>nd</sup> Int Cong Rad Res (ICRR), USA. *Imaging genomics*
- 2016 ESTRO35, Italy. *Genomics and imaging: a pas-de-deaux in response prediction*
- CERRO – Int Conf on Clinical and Experimental Research in Radiation Oncology, France:
- 2018 *MicroRNA regulation by hypoxia and lactic acidosis in cervical cancer*
- 2017 *Genomics and imaging of hypoxia in prostate cancer*

## **INVITED INTERNATIONAL TEACHING (last 5 years)**

- 2020 Pre-meeting course *Interaction between the tumor ecosystem (microenvironment) and radiation* at ESTRO2020, Austria
- 2017 Pre-meeting course *Multimodality Imaging in Radiation Oncology* at ESTRO36, Austria

## **PATENTS**

- 2014 Methods and biomarkers for detection and prognosis of cervical cancer (WO2015107430A3)
- 2012 Biomarkers for cervical cancer (WO2014072832A3)
- 2012 Methods and biomarkers for detection and prognosis of cervical cancer (WO2013124738A2)
- 2010 Biomarkers for subtypes of cervical cancer (US20110224088A1)

## List of Publications

Author of 106 articles in international peer reviewed journals, including 9 reviews and book chapters, 32 as first author, 30 as corresponding author, *h*-index (ISI Web of Science): 31

### Selected original articles as corresponding author

1. Skipar K, Hompland T, Lund KV, Løndalen A, Malinen E, Kristensen GB, Lindemann K, Nakken ES, Bruheim K, **Lyng H**. Risk of recurrence after chemoradiotherapy identified by multimodal MRI and 18F-FDG-PET/CT in locally advanced cervical cancer, *Radiotherapy and Oncology*, 176, 17-24, 2022.
2. Salberg UB, Skingen VE, Fjeldbo CS, Hompland T, Ragnum HB, Vlatkovic L, Hole KH, Seierstad T, **Lyng H**. A prognostic hypoxia gene signature with low heterogeneity within the dominant tumour lesion in prostate cancer patients. *British Journal of Cancer*, 127, 321-328, 2022.
3. Nilsen A, Hillestad T, Skingen VE, Aarnes EK, Fjeldbo CS, Hompland T, Evensen TS, Stokke T, Kristensen GB, Grallert B, **Lyng H**. miR-200a/b/-429 downregulation is a candidate biomarker of tumor radioresistance and independent of hypoxia in locally advanced cervical cancer. *Molecular Oncology*, 16, 1402-1419, 2022.
4. Hillestad T, Hompland T, Fjeldbo C, Skingen VE, Salberg UB, Aarnes E-K, Nilsen A, Lund KV, Evensen TS, Kristensen GB, Stokke T, **Lyng H**. MR imaging distinguishes tumor hypoxia levels of different prognostic and biological significance in cervical cancer. *Cancer Research*, 15; 80: 3993-4003, 2020.
5. Fjeldbo CS, Hompland T, Hillestad T, Aarnes E-K, Günther C-C, Kristensen GB, Malinen E, **Lyng H**. Combining imaging- and gene-based hypoxia biomarkers in cervical cancer improves prediction of chemoradiotherapy failure independent of intratumor heterogeneity. *EBioMedicine*, 57, 102841, 2020.  
\*Featured in invited commentary, *EBioMedicine*, 58,10291, 2020.
6. Jonsson M, Christina Sæten Fjeldbo CS, Holm R, Stokke T, Kristensen GB, **Lyng H**. Mitochondrial function of CKS2 oncoprotein links oxidative phosphorylation with cell division in chemoradioresistant cervical cancer. *Neoplasia*, 21, 353-362, 2019.
7. Nilsen A, Jonsson M, Aarnes EK, Kristensen GB, **Lyng H**. Reference MicroRNAs for RT-qPCR assays in cervical cancer patients and their application to studies of HPV16 and hypoxia biomarkers. *Translational Oncology*, 12, 576-584, 2019.
8. Lam KC, Vyshenska D, Hu J, Rodrigues RR, Nilsen A, Zielke RA, Brown NS, Aarnes EK, Sikora AE, Shulzhenko N, **Lyng H**, Morgun A. Transkingdom network reveals bacterial players associated with cervical cancer gene expression program. *PeerJ*, 6, e5590, 2018.  
\*Lyng and Morgun are shared corresponding authors
9. Hompland T, Hole KH, Ragnum HB, Aarnes EK, Vlatkovic L, Lie AK, Patzke S, Brennhovd B, Seierstad T, **Lyng H**. Combined MR imaging of oxygen consumption and supply reveals tumor hypoxia and aggressiveness in prostate cancer patients. *Cancer Research*, 78:4774-4785, 2018.  
\*Featured in "Research Highlights" in *Nature Reviews Urology*, 13 July 2018  
\*Excellent Paper Award 2018, Oslo University Hospital
10. Jonsson M, Ragnum HB, Julin CH, Yeramian A, Clancy T, Frikstad K-AM, Seierstad T, Stokke T, Matias-Guiu X, Ree AH, Flatmark K, **Lyng H**. Hypoxia independent gene expression signature associated with radiosensitisation of prostate cancer cell lines by histone deacetylase inhibition. *British Journal of Cancer*, 115, 929-939, 2016.

11. Fjeldbo CS, Aarnes EK, Malinen E, Kristensen GB, **Lyng H**. Identification and validation of reference genes for RT-qPCR studies of hypoxia in squamous cervical cancer patients. *PLOS ONE*, 11, e0156259, 2016.
12. Fjeldbo CS, Julin CH, Lando M, Forsberg MF, Aarnes EK, Alsner J, Kristensen GB, Malinen E, **Lyng H**. Integrative analysis of DCE-MRI and gene expression profiles in construction of a gene classifier for assessment of hypoxia-related risk of chemoradiotherapy failure in cervical cancer. *Clinical Cancer Research*, 22, 4067-4076, 2016.
  - \*Featured in "Highlights of this issue", *Clin Cancer Res*, 22, 3985, 2016.
  - \*Excellent Paper Award 2016, Oslo University Hospital
13. Lando M, Fjeldbo CS, Wilting SM, Snoek B, Forsberg MF, Kristensen GB, Steenbergen RD, **Lyng H**. Interplay between promoter methylation and chromosomal loss in gene silencing at 3p11-p14 in cervical cancer. *Epigenetics*, 10, 970-980 2015.
14. Ragnum HB, Vlatkovic L, Lie AK, Axcrona K, Julin CH, Frikstad K-AM, Hole KH, Seierstad T, **Lyng H**. The hypoxia marker pimonidazole reflects a transcriptional program associated with aggressive prostate cancer. *British Journal of Cancer*, 112, 382-390, 2015.
15. Lando M, Wilting SM, Snipstad K, Clancy T, Bierkens M, Holden M, Stokke T, Sundfør K, Holm R, Kristensen GB, Steenbergen RDM, **Lyng H**. Identification of eight candidate target genes of the recurrent 3p12-p14 loss in cervical cancer by integrative genomic profiling. *Journal of Pathology*, 230, 59-69, 2013.
16. Ragnum HB, Røe K, Holm R, Vlatkovic L, Nesland JM, Aarnes E-K, Ree AH, Flatmark K, Seierstad T, Lilleby W, **Lyng H**. Hypoxia-independent downregulation of hypoxia inducible factor 1 targets by androgen deprivation therapy in prostate cancer. *International Journal of Radiation Oncology, Biology and Physics*, 87, 753-760, 2013.
  - \*Featured in "Issue Highlights", *Int J Radiat Oncol Bio Phys*, 87, A16, 2013
17. Halle C, Andersen E, Lando M, Aarnes EK, Hasvold G, Holden M, Syljuåsen RG, Sundfør K, Kristensen GB, Holm R, Malinen E, **Lyng H**. Hypoxia-induced gene expression in chemoradioresistant cervical cancer revealed by dynamic contrast enhanced MR-imaging. *Cancer Research*, 72, 5285-95, 2012.
18. Halle C, Lando M, Svendsrud DH, Clancy T, Holden M, Sundfør K, Kristensen GB, Holm R, **Lyng H**. Membranous expression of ectodomain isoforms of the epidermal growth factor receptor predicts outcome after chemoradiotherapy of lymph node negative cervical cancer. *Clinical Cancer Research*, 17, 5501 – 5512, 2011.
  - \*Featured in "Highlights", *Clinical Cancer Research*, 17, 5215, 2011.
19. Halle C, Lando M, Sundfør K, Kristensen GB, Holm R, **Lyng H**. Phosphorylation of EGFR measured with in situ proximity ligation assay: relationship to EGFR protein level and gene dosage in cervical cancer. *Radiotherapy and Oncology*, 101, 152-157, 2011.
20. Bergersen LC, Glad IK, **Lyng H**. Weighted lasso for data integration. *Statistical Applications in Genomics and Molecular Biology*, 10, 1, Article 39, 2011.
21. Lando M, Holden H, Bergersen LC, Svendsrud DH, Stokke T, Sundfør K, Glad IK, Kristensen GB, **Lyng H**. Gene dosage, expression, and ontology analysis identifies driver genes in the carcinogenesis and chemoradioresistance of cervical cancer. *PLoS Genetics*, 5: e1000719, 2009.
  - \*Featured in "Nature Research Highlights", *Nature*, 462, 254, 2009.

### **Selected scientific review articles as corresponding author**

1. Lyng H, Skipar K, Hompland T. Targeted therapy on the screen: Do we hit the target? *Clinical Cancer Research*, in press, 2022.
2. Hompland T, Fjeldbo CS, **Lyng H**. Tumor Hypoxia as a Barrier in Cancer Therapy: Why Levels Matter. *Cancers*, 13; 499, 2021.

### **Popular science**

1. Nilsen A, **Lyng H**. Stråleterapi: Ny forskning og nye behandlingsmuligheter. *Sammen mot Kreft, Dagbladet* og [www.altomdinhelse.no](http://www.altomdinhelse.no), 2021.
2. Waldeland E, Bratland Å, **Lyng H**. Etablering av protonterapi – et løft for stråleterapiforskningen i Norge. *Onkonytt*, 18 (2), 18-20, 2020.
3. **Lyng H**. Regionalt forskningsnettverk i stråleterapi. *Onkonytt*, 16, 48-50, 2018.