

AI MEETS CANCER RESEARCH
11-12 November 2025

AI MEETS CANCER RESEARCH SYMPOSIUM 2024

LOCATION

SPANISH NATIONAL CANCER RESEARCH CENTRE – CNIO
MELCHOR FERNÁNDEZ ALMAGRO, 3, 28029
MADRID, SPAIN

SYMPOSIUM CHAIRS

MARIA A. BLASCO, PHD

DIR. OF THE SPANISH NATIONAL CANCER RESEARCH CENTRE (CNIO)

RAUL RABADAN, PHD

DIR., MATHEMATICAL GENOMICS PROGRAM (PMG), DEPT. SYSTEMS BIOLOGY &
BIOLOGICAL INFORMATICS, COLUMBIA UNIVERSITY IRVING MEDICAL CENTER

ANIL RUSTGI, MD

DIR. HERBERT IRVING COMPREHENSIVE CANCER CENTER,
COLUMBIA UNIVERSITY IRVING MEDICAL CENTER (HICCC)

ALFONSO VALENCIA, PHD

DIR. LIFE SCIENCES DEPT. ICREA RESEARCH PROFESSOR,
BARCELONA SUPERCOMPUTING CENTER (BSC).

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REGISTRATION



cnio stop cancer

 **COLUMBIA**
COLUMBIA UNIVERSITY
HERBERT IRVING COMPREHENSIVE
CANCER CENTER

 **THE PROGRAM FOR
MATHEMATICAL
GENOMICS**

 **Barcelona
Supercomputing
Center**
Centro Nacional de Supercomputació

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Venue:

Spanish National Cancer Research Centre – CNIO Auditorium, Madrid, Spain

Organizing committee:

Maria A. Blasco, Director of the Spanish National Cancer Research Centre (CNIO)

Raul Rabadan, Director of Mathematical Genomics Program (PMG), Dept. Systems Biology & Biological Informatics, Columbia University Irving Medical Center

Anil Rustgi, Director of the Herbert Irving Comprehensive Cancer Center, Columbia University Irving Medical Center (HICCC)

Alfonso Valencia, Director of Life sciences dept. ICREA research professor, Barcelona supercomputing center (BSC).

Speakers:

- **Mohammed Alquraishi**, Program for Mathematical Genomics Department of Systems Biology Columbia University Medical Center
- **Fatima Al-Shahrour**, Bioinformatics Unit Spanish National Cancer Research Centre (CNIO)
- **Alberto Ciccia**, Department of Genetics & Development Columbia University Irving Medical Center
- **Marcos Diaz-Gay**, Cellular and Molecular Medicine Department University of California San Diego
- **Joaquin Dopazo**, Computational Systems Medicine Group Fundación Progreso y Salud
- **Anum Glasgow**, Department of Biochemistry/MolBiophyscs Columbia University Irving Medical Center
- **Daniel Gonzalez-Peña**, Bioinformatics & Machine Learning University of Vigo
- **Despina Kontos**, Department of Radiology Columbia University Irving Medical Center
- **Tal Korem**, Program for Mathematical Genomics Department of Systems Biology Columbia University Medical Center
- **Michal Levo**, Program for Mathematical Genomics Dept Biochemistry/MolBiophyscs Columbia University Medical Center
- **Oscar Llorca**, Macromolecular Complexes in DNA Damage Response Spanish National Cancer Research Centre (CNIO)
- **Geoff Macintyre**, Computational Oncology Group Spanish National Cancer Research Centre (CNIO)
- **Nuria Malats**, Genetic and Molecular Epidemiology Group Spanish National Cancer Research Centre (CNIO)
- **Jaewon Min**, Department of Pathology and Cell Biology Columbia University Irving Medical Center
- **Macha Nikolski**, Bordeaux Bioinformatics Center (CBiB) Université Bordeaux
- **Beatriz Ocaña-Tienda**, Mathematical Oncology University of Castilla Mancha University
- **Vera Pancaldi**, Life Sciences - Computational Biology Life Sciences Group Barcelona Supercomputing Center
- **Solip Park**, Computational Cancer Genomics Group Spanish National Cancer Research Centre (CNIO)
- **Raul Rabadan**, Program for Mathematical Genomics Department of Systems Biology Columbia University Medical Center
- **Antonio Rausell**, Clinical Bioinformatics Research Laboratory Imagine Institute Paris
- **Daniel Rico**, Computational Epigenomics and Cell Identity CABIMER Sevilla
- **Yufeng Shen**, Program for Mathematical Genomics Department of Systems Biology Columbia University Irving Medical Center
- **David Torrents**, Life Sciences - Computational Genomics Barcelona Supercomputing Center Biology Life Sciences Group Barcelona Supercomputing Center

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Monday November 11th, 2024

10.00 – 10.50 Registration

10.50-11.30 - INTRO AND WELCOME BY SYMPOSIUM CHAIRS

Maria A. Blasco, Spanish National Cancer Research Centre (CNIO)

Raul Rabadan, Program for Mathematical Genomics, Department of Systems Biology, Columbia University Medical Center

Emer Smyth, Herbert Irving Comprehensive Cancer Center, Columbia University Irving Medical Center

Alfonso Valencia, Computational Biology Life Sciences Group, Barcelona Supercomputing Center

11.30 – 13.10 - 1ST SESSION CANCER RESEARCH

Chair: Raul Rabadan

11.30-11.55 Mohammed Alquraishi, Program for Mathematical Genomics Department of Systems Biology
Columbia University Medical Center

11.55-12.20 The Therapeutic Cancer Cell Atlas (TCCA): a single-cell resource for cancer treatment prediction

Fatima Al-Shahrour, Bioinformatics Unit Spanish National Cancer Research Centre (CNIO)

12.20-12.45 Extracting single residue energetic information from HX/MS experiments

Anum Glasgow, Department of Biochemistry/MolBiophyscs Columbia Univ. Irving Medical Center

12.45-13.10 Combining cryo-EM and AI to understand fundamental processes in cancer

Oscar Llorca, Macromolecular Complexes in DNA Damage Response Spanish National Cancer Research Centre (CNIO)

13.10 – 14.40 Lunch break – canteen - please wear your badge visibly and show it to the cashier

14.40-16.20 - 2ND SESSION CANCER RESEARCH

Chair: Maria A. Blasco

14.40-15.05 Illuminating the Dark Cancer Genome using Foundation Models

Raul Rabadan, Program for Mathematical Genomics Department of Systems Biology Columbia University Medical Center

15.05-15.30 Forging the right connections in a genomic maze – towards a dynamic rather than a static view

Michal Levo, Program for Mathematical Genomics Dept Biochemistry/MolBiophyscs Columbia University Medical Center

15.30-15.55 AI-IA (AI-based Image Analysis) in Clinical Epidemiology

Nuria Malats, Genetic and Molecular Epidemiology Group Spanish National Cancer Research Centre (CNIO)

15.55-16.20 Microbiome in The Cancer Genome Atlas: concerns, insights, and state of the evidence

Tal Korem, Program for Mathematical Genomics Department of Systems Biology Columbia University Medical Center

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16.20 – 16.45 Coffee break – hall

16.45 -18.00 - 3RD SESSION AI

Chair: Alfonso Valencia

- 16.45-17.10** Unraveling the mutagenic forces shaping the genomic landscape of lung cancer in never smokers using mutational signatures
Marcos Diaz-Gay, Cellular and Molecular Medicine Department University of California San Diego
- 17.10-17.35** New analysis frames for predicting risk of complex diseases
David Torrents, Life Sciences - Computational Genomics Barcelona Supercomputing Center
- 17.35-18.00** Machine learning strategies for the clinical assessment of germline genetic variants
Antonio Rausell, Clinical Bioinformatics Research Laboratory Imagine Institute Paris

18.00 – 18.45 NETWORKING - Open discussion - All attendees welcome

Tuesday November 12th, 2024

09.55- 10.25 - 2ND DAY WELCOME & SPECIAL SESSION

Chair: Raul Rabadan

10.25-11.40 - 4TH SESSION: AI

Chair: Emer Smyth

- 10.25-10.50** TrialMatchAI: An AI - powered Natural Language Processing System for the Automatic Matching of Cancer Patients to Precision Clinical Trials
Macha Nikolski, Bordeaux Bioinformatics Center (CBiB) Université Bordeaux
- 10.50-11.15** Exploring Complex and Unanswered Cancer Questions through AI
Solip Park, Computational Cancer Genomics Group Spanish National Cancer Research Centre (CNIO)
- 11.15-11.40** PolyDeep and PolyDeepAdvance: from the AI-lab to the clinical trials
Daniel Gonzalez-Peña, Bioinformatics & Machine Learning University of Vigo

11.40 – 12.00 Coffee break – hall

12.05-13.20 - 5TH SESSION: AI & MOLECULES

Chair: Oscar Llorca

- 12.05-12.30** Representation and prediction of the impact of protein mutations
Yufeng Shen, Program for Mathematical Genomics, Department of Systems Biology Columbia University Irving Medical Center
- 12.30-12.55** Realistic simulation of therapeutic interventions with machine learning
Joaquin Dopazo, Computational Systems Medicine Group, Fundación Progreso y Salud
- 12.55-13.20** Epigenomic Signatures of Cell Identify and Cancer
Daniel Rico, Computational Epigenomics and Cell Identity, CABIMER Sevilla

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13.20 – 14.50 Lunch break – canteen - please wear your badge visibly and show it to the cashier

14.50-16.05 - 6TH SESSION: AI & MOLECULES

Chair: Fatima Al-Shahrour

14.50-15.15 Beyond AI: mechanistic mathematical models for biomarker discovery, treatment optimization and in-silico clinical trial design

Beatriz Ocaña-Tienda, Mathematical Oncology University of Castilla Mancha University

15.15-15.40 Network-based analysis of the DNA damage response with CRISPR screening

Alberto Ciccía, Department of Genetics & Development Columbia University Irving Medical Center

15.40-16.05 Computational Imaging Biomarkers in Precision Cancer Care: Leveraging Machine Learning and AI for Novel Integrated Diagnostics

Despina Kontos, Department of Radiology Columbia University Irving Medical Center

16.05 – 16.30 Coffee break – hall

16.30 – 17.45 - 7TH SESSION: CANCER RESEARCH

Chair: Alberto Ciccía

16.30-16.55 Forecasting tumor evolution

Geoff Macintyre, Computational Oncology Spanish National Cancer Research Centre (CNIO)

16.55-17.20 Understanding extrachromosomal telomere DNA generation in ALT cancers

Jaewon Min, Department of Pathology and Cell Biology Columbia University Irving Medical Center

17.20-17.45 Network approaches to data-driven models of the tumour microenvironment

Vera Pancaldi, Life Sciences - Computational Biology Life Sciences Group Barcelona Supercomputing Center

17.45 SYMPOSIUM CLOSE - SYMPOSIUM CHAIRS

Maria A. Blasco, Raul Rabadan, Emer Smyth, Alfonso Valencia

