ANTONIO MAFFIA, PHD

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Senior Scientist

Creative and results-driven Senior Scientist with 5+ years of experience in molecular biology, functional genomics, and cell-based high-throughput screening. Proven success in project management, experimental design, data analysis, and resolving process scalability challenges. Effective in cross-functional teams with a track record of driving R&D innovation.

Key Achievements:

- **Accelerated protein engineering throughput 1,000×** by implementing pooled lentiviral CRISPR screening strategies.
- **Boosted cell-based drug screening capacity 100×** through a scalable gene-editing pipeline and automated phenotypic assays.
- **Orchestrated cross-functional collaborations**, streamlining project management and data-driven decision-making across R&D teams and pharma partners.

Technical Core Skills: Molecular Biology · High-Throughput Screening · Mammalian Cells Engineering · Functional Genomics · Cell-Based Assay Development

Operational Core Skills: Project Management · Cross-functional Collaboration · Communication · Adaptability

PROFESSIONAL EXPERIENCE

Mammoth Biosciences · Brisbane, CA **May 2023 - Nov 2024**

Senior Scientist I

- Designed and implemented high-throughput pooled lentiviral CRISPR screens, accelerating cell-based protein engineering workflows 1,000×.
- Developed and optimized combinatorial lentiviral library pipelines, achieving above 80% accuracy in library representation for engineered mammalian systems.
- Scaled mRNA nucleofection workflows 4×, increasing reproducibility and efficiency of epigenetic effector assays.
- Led project coordination across 6 cross-functional teams, improving strategic alignment and reducing decision timelines by 30%.

University of California, Berkeley · Berkeley, CA **Mar 2020 - May 2023**

Research Scientist

- Engineered novel stem cells cancer models for synthetic lethality screening in partnership with GlaxoSmithKline (GSK); enabled pooled CRISPR screens of ~25,000 targets.
- Co-developed a scalable nucleofection and immunofluorescence platform to generate and screen 100–200× more knockout cell lines for phenotypic profiling.
- Developed a new embryonic stem cell model that achieved a 10,000× increase in immortalization efficiency, supporting regenerative medicine applications.
- Co-first author on a Nature Communications publication demonstrating a high-throughput, cell-based platform for telomere-related therapeutic discovery.

Institute of Molecular Genetics · Pavia, Italy **Oct 2018 - Feb 2020**

Research Scientist

- Engineered 2 CRISPR/HDR cell lines disrupting key DNA-repair protein modifications, creating platforms for therapeutic target discovery.
- Mentored 2 graduate students and 5+ colleagues, driving experimental design, data analysis, and manuscript development for multiple publications.
- Led chemical screening campaigns of DNA-structure binders, uncovering modulators of DNA repair and cell-cycle control for targeted cancer therapies.
- Published findings in top peer-reviewed journals, advancing understanding of genomic stability mechanisms *in vivo*.

TECHNICAL SKILLS

- **High-Throughput Development**
  High-throughput Screening Platforms: Platform Design & Automation (automated DNA transfection, automated RNA extraction, automated mRNA arraying) · Arrayed Automated Phenotypic Analysis Workflows (High-throughput Immunostaining; High-throughput Immunofluorescence) · Arrayed Automated Gene Editing Pipelines (High-throughput Knockout Cell Line Generation)
  Automation Tools: Tecan · Hamilton · Integra Viaflo · Tecan Fluent · Qpix Colony Picking
  Liquid Handling & DNA Analysis: KingFisher · ZAG DNA Analyzer · Agilent TapeStation

- **Functional Genomics**
  Pooled Libraries Generation: Pooled Library Design · Lentiviral Vectors Design & Optimization · Libraries Cloning · Libraries QC· Lentivirus Preparation· Lentivirus Enrichment · Lentivirus Titration and MOI · Lentivirus Transduction
  Screening Applications: Viability Drop-out Screens (synthetic lethality, drug target ID) · Protein Engineering (fusion domains permutations, chimeric proteins, saturation mutagenesis) · Gene Expression Perturbation (non-coding sequences interrogation, transcription factors/effectors screening)

- **Gene Editing & Cell Engineering**
  Gene Editing: CRISPR Cas9 system · Knockout · Knock-in · CRISPRi/CRISPRa systems
  Cell Engineering: Transgene Expression · Gene Silencing/Activation · Stable Clonal Cell Lines · Pooled Cell Line
  Delivery: DNA Transfection · siRNA Transfection · mRNA Nucleofection · RNP Nucleofection · Lentiviral Transduction (Transgene Overexpression, shRNA)
  Cell Culture: Stem Cells · Stem Cells Differentiation · Cancer Cell Lines · Primary Cell Lines
  Reporter Cell Lines Design & QC: FACS-based Readout · Sequencing-based Readout · Fluorescent Stable Cell Reporters · Gene Expression Reporter Design · Protein Engineering Reporter · Cell-Surface Antigen Reporter

- **Assay Development**
  Fluorescence & FACS Assays: Immunostaining · Confocal Microscopy & Live Cell Imaging (FRET, FRAP) · Protein Colocalization & Interaction (PLA, Split-Tag, BiFC) · Chromosome FISH · Fluorescence Cell Sorting · Cell Cycle Analysis · Viability Assays · Surface Marker Staining & Detection · Fluorescence Gene Expression
  In vitro assays: Recombinant Proteins Enzymatic Activity Assays (Phosphorylation, Binding, Primer Extensions, DNA Elongation, Fluorescent-based assays, Radioactive-based Assays)

- **Molecular Biology**
  DNA/RNA Manipulation: Recombinant DNA Cloning (Golden Gate, Gibson Assembly, Restriction Cloning) · DNA extraction · Site-Directed Mutagenesis · Expression Vectors Design & Optimization · RNA extraction · PCR · RT-PCR · qPCR · ddPCR · Sequencing Library Prep
  Biochemistry: Recombinant Protein Expression · Protein Purification (HPLC, AKTA) · Antibody Purification · SDS-PAGE · Western Blot · Immunoprecipitation · Pull-Down

- **Platforms & Data Analysis**
  Imaging & Flow Cytometry: Perkin Elmer Opera Phenix · ZEISS LSM 900 · Leica TCS SP8 · BD Facs Sorters (Aria Fusion, LSR Fortessa, Symphony) · Biorad S3
  Sequencing: Illumina NextSeq, MiSeq · Nanopore
  Data Tools: Python · R · JMP · CRISPResso · Fiji/ImageJ · GraphPad PRISM · FlowJo · FCS Express · Microsoft Office · Adobe Illustrator & Photoshop

- **Soft Skills & Leadership**
  Soft Skills: Project Management · Leadership · Strategic Thinking · Problem Solving · Risk Management · Troubleshooting · Communication & Presentation · Cross-Functional Collaboration · Adaptability & Resilience · Project Management · Attention to Detail · Decision-Making · Innovation & Curiosity
  Management Tools: Smarsheet, Confluence, Benchling, Jira, Slack, Zapier

EDUCATION & CREDENTIALS

University of Pavia · Pavia, IT **Oct 2015 - Sep 2018**
PhD Fellow

- **Developed a patient-derived Xeroderma Pigmentosum cell line**, enabling the first in vivo DNA polymerase activity assays via targeted protein engineering.
- **Elucidated novel DNA damage response mechanisms** by profiling human cell sensitivity to G-quadruplex binders, uncovering new targets for repair pathway intervention.

Technische Universität · Darmstadt, DE **Mar 2015 - Jun 2015**
Visiting Student Researcher

- **Built high-throughput live-cell imaging pipelines**, quantifying temporal recruitment kinetics of DNA damage proteins in cancer models.
- **Optimized fluorescent-tagged protein constructs**, enhancing imaging precision and signal fidelity for dynamic DNA repair studies.

University of Pavia · Pavia, IT **Oct 2013 - Jul 2015**
Master Student

- **Mapped tumor suppressor–mediated DNA repair recruitment**, using immunofluorescence and biochemical assays to define key protein interactions in human cells.

University of Milano-Bicocca · Milan, IT **Oct 2010 - Jul 2013**
Bachelor Student

- **Streamlined bacterial enzyme purification workflows**, increasing yield and catalytic activity to support downstream biochemical and structural analyses.

SELECTED PUBLICATIONS

(a more comprehensive list is available upon request)

- Turkalo K. T.* **Maffia, A***., Regalado, G. S., Blanchette, M., Spierings, C. J., Lansdorp, P. M., Hockemeyer, D. (**2023**). A non-genetic switch triggers alternative telomere lengthening and cellular immortalization in ATRX deficient cells. *Nature Communications, 14(1). *Authors have equally contributed to the work*.
- **Maffia, A.**, Ranise, C., & Sabbioneda, S. (**2020**). From R-Loops to G-Quadruplexes: Emerging New Threats for the Replication Fork. *International Journal of Molecular Sciences. 21 (4)*.
- Cipolla, L., Bertoletti, F., **Maffia, A.**, Liang, C. C., Lehmann, A. R., Cohn, M. A., Sabbioneda, S. (**2019**). UBR5 interacts with the replication fork and protects DNA replication from DNA polymerase η toxicity. *Nucleic acids research, 47 (21)*.
- Cipolla, L., **Maffia, A.**, Bertoletti, F., & Sabbioneda, S. (**2016**). The regulation of DNA damage tolerance by ubiquitin and ubiquitin-like modifiers. *Frontiers in genetics, 7 (105)*.

OUTREACH & ENGAGEMENT

- **Scientific Presentations:** Delivered talks and poster presentations at international and national conferences, including the EMBO Workshop (2022), University of Leiden (2018), and 6th EU-US DNA Damage Conference (2017).
- **Peer-Review Activities:** Invited reviewer for journals such as *Frontiers in Oncology* and *Frontiers in Genetics* (2022).
- **Community Leadership:** Co-directed scientific outreach activities, organized PhD/postdoc events, and contributed to the UC Berkeley SARS-CoV-2 PCR test initiative (2020–2022).