Deepali L. Kundnani

I work at the intersection of **biology, statistics,** and **computation** with **Dr. Francesca Storici** as a Bioinformatics Ph.D. Graduate Research Assistant in the Storici Lab at Georgia Institute of Technology. My research has a strong application focus on the field of genomics and epigenomics with the goal to delineate presence of ribonucleotides(constructs of RNA) in human genomic DNA in both cancer and non-cancer cell types.

Through my work in The Storici Lab, I have recently developed an R **package** and **received US National Science Foundation Conference Award** for a **poster presentation** in RNA Society 2021

Before coming to Georgia Tech, I have been fortunate to work with amazing doctors and scientists at Hanash Lab in **MD Anderson Cancer Center** and have been a part of incredible effort in diagnostics of **Lung Cancer Risk Assessment Biomarkers.**

 **Website**
 **LinkedIn**
 **Email**
 **Google Scholar**
 **GitHub**

Education

Ph.D.	**Bioinformatics** – GPA 4.00/4.00 Georgia Institute of Technology Atlanta, GA – USA	Aug 2019 – Present
M.S.	**Molecular Biotechnology** – GPA 3.88/4.00 University of Houston – Clear Lake Houston, TX – USA	Aug 2013 – May 2015
B.E.	**Biotechnology** University of Mumbai Mumbai, India	Aug 2008 – May 2012

Honors and Awards

US National Science Foundation Conference Award 2021
Awarded for Poster presented on "The Expression Correlation and Copy Number Alteration(CNA) Prevalence of Human RNASEH2A in cancer supports a role for RNASEH2A in cancer proliferation."
The 26th Annual Meeting of the RNA Society - RNA 2021.

Jones NAS Biological Sciences Scholarship 2014-2015
Merit based scholarship for students in Biological Sciences department
University of Houston, Clear-Lake, TX, USA

Third Prize in National level Technical Paper Presentation 2012
Prize awarded for presentation on "Genetic Algorithms" by Institute of Electrical and Electronics Engineers (IEEE) committee
University of Mumbai, India

Research Projects

Studying ribonucleotide incorporation in *S. cerevisiae* containing Aicardi-Goutières syndrome (AGS) causing mutants in RNASEH2A/C orthologous gene 2022-present
Graduate Research Assistant, Storici Lab, Georgia Institute of Technology, USA

- Finding the effect of different AGS mutants on rNMP incorporation rates in nuclear and mitochondrial genome
- Statistical testing to find differentially incorporated regions in the WT vs mutant cell lines
- Finding differences in genomic content preference upstream and downstream of ribonucleotide incorporation.

Studying ribonucleotide incorporation in human non- cancer and cancer cell type 2021-present
Graduate Research Assistant, Storici Lab, Georgia Institute of Technology, USA

- Mapping ribonucleotides on the human genome in various annotated regions of the human genome to study functional role/association of ribonucleotide incorporation.
- Using probability distribution models to filter highly incorporated locations (hotspots) in the human cell lines/types.
- Finding DNA sequence motifs or patterns of near the site of ribonucleotide incorporation.

Understanding association of RNASEH2A gene in cancer 2020-2021
Graduate Research Assistant, Storici Lab, Georgia Institute of Technology, USA

- Expression correlation of RNASEH2A with cancer proliferation and cell cycle markers in large cancer cell lines and tissue datasets.
- Copy number alteration prevalence of RNASEH2A gene in different cancers from The Cancer Genome Atlas (TCGA)-Pan Cancer Dataset.

Discovery and validation of protein biomarkers (Diagnostic/Therapeutic) in cancer 2015-2019

Research Assistant, Hanash Lab, M.D. Anderson Cancer Research Center, USA

- Utilizing Genomic and expression data to validate proteomic findings in various cancers cell lines.
- Investigating splice variants to find novel antigens in cancer.
- Validation of Protein Biomarker Panel for Early Detection of Lung and Pancreatic Cancer.
- Development of auto-antibody test for Lung and Breast Cancer detection.

2015

Development of Enzyme linked Immuno Assay kits for proteins used in diagnosis of various diseases.

Lab Technician, Ansh Labs, USA

- Antibody production for novel diagnostic ELISA kits.
- Production of highly sensitive antigens in mammalian cell lines.

Screening human lung cDNA library from Asthma patients for protein interaction with inducible Nitrous Oxide Synthase 2014

Independent student, Bazlur Lab, University of Houston – Clear Lake, USA

- Employed a yeast two-hybrid system to detect protein interaction between iNOS (Inducible Nitrous Oxide Synthetase) and human lung cDNA libraries from Asthma patients, followed by sequencing and identification of genes

Creating and testing vectors for high and efficient production of monoclonal Antibodies in the mammalian cells lines 2012-2013

Research Assistant, Usha Biotech, India

- Testing of a various proprietary vector (including patented CELL EXPRESS - 100™ system) using eGFP reporter gene on CHO-K1 cell line.

Assessment of Stem Cell Therapy and Analogous Wound Care Techniques for diabetic foot complications in reference to the standard therapy 2011-2012

Trainee, S.L.Raheja Hospital, Mumbai, India (B.E. Thesis)

- Track clinical trial from patient inclusion, consent to final day follow up of treatments.
- Built statistical analysis to evaluate therapy/drug effectivity.

Publications

Journal Publications

Kundnani, D., & Storici, F. (2021). **FeatureCorr: An R package to study feature correlations aided with data transformation for sequencing and microarray data.** *Software Impacts*, *10*, 100144.

PDF **REVIEW** **CODE**

Marsili, S., Tichon, A., Kundnani, D., & Storici, F. (2021). **Gene co-expression analysis of human rnaseh2a reveals functional networks associated with dna replication, dna damage response, and cell cycle regulation.** *Biology*, 10(3), 221.
PDF **REVIEW**

Ostrin, E. J., Bantis, L. E., Wilson, D. O., Patel, N., Wang, R., Kundnani, D., Adams-Haduch, J., Dennison, J. B., Fahrmann, J. F., Chiu, H. T., Gazdar, A., Feng, Z., Yuan, J. M., & Hanash, S. M. (2021). **Contribution of a Blood-Based Protein Biomarker Panel to the Classification of Indeterminate Pulmonary Nodules.** *Journal of Thoracic Oncology*, 16(2), 228–236.
IMPACT

Kobayashi, M., Katayama, H., Irajizad, E., Vykoukal, J. V., Fahrmann, J. F., Kundnani, D. L., Yu, C.-Y., Cai, Y., Hsiao, F. C., Yang, W.-L., Lu, Z., Celestino, J., Long, J. P., Do, K.-A., Lu, K. H., Ladd, J. J., Urban, N., Bast Jr., R. C., & Hanash, S. M. (2020). **Proteome Profiling Uncovers an Autoimmune Response Signature That Reflects Ovarian Cancer Pathogenesis.** *Cancers*, 12(2), 485.
PDF

Subbalakshmi, A. R., Kundnani, D., Biswas, K., Ghosh, A., Hanash, S. M., Tripathi, S. C., & Jolly, M. K. (2020). **NFATc Acts as a Non-Canonical Phenotypic Stability Factor for a Hybrid Epithelial/Mesenchymal Phenotype.** *Frontiers in Oncology*, 10, 1794.
PDF **IMPACT**

Capello, M., Fahrmann, J. F., Rios Perez, M. V., Vykoukal, J. V., Irajizad, E., Tripathi, S. C., Roife, D., Bantis, L. E., Kang, Y., Kundnani, D. L., Xu, H., Prakash, L. R., Long, J. P., Katayama, H., Fleury, A., Ferri-Borgogno, S., Baluya, D. L., Dennison, J. B., Aguilar-Bonavides, C., … Hanash, S. M. (2020). **CES2 Expression in Pancreatic Adenocarcinoma Is Predictive of Response to Irinotecan and Is Associated With Type 2 Diabetes.** *JCO Precision Oncology*, 4, 426–436.
PDF

Jia, D., George, J. T., Tripathi, S. C., Kundnani, D. L., Lu, M., Hanash, S. M., Onuchic, J. N., Jolly, M. K., & Levine, H. (2019). **Testing the gene expression classification of the EMT spectrum.** *Physical Biology*, 16(2), 025002.
PDF **IMPACT**

Capello, M., Vykoukal, J. V., Katayama, H., Bantis, L. E., Wang, H., Kundnani, D. L., Aguilar-Bonavides, C., Aguilar, M., Tripathi, S. C., Dhillon, D. S., Momin, A. A., Peters, H., Katz, M. H., Alvarez, H., Bernard, V., Ferri-Borgogno, S., Brand, R., Adler, D. G., Firpo, M. A., … Hanash, S. M. (2019). **Exosomes harbor B cell targets in pancreatic adenocarcinoma and exert decoy function against complement-mediated cytotoxicity.** *Nature Communications*, 10(1), 1–13.
PDF **REVIEW**

Fahrmann, J. F., Bantis, L. E., Capello, M., Scelo, G., Dennison, J. B., Patel, N., Murage, E., Vykoukal, J., Kundnani, D. L., Foretova, L., Fabianova, E., Holcatova, I., Janout, V., Feng, Z., Yip-Schneider, M., Zhang, J., Brand, R., Taguchi, A., Maitra, A., … Hanash, S. (2019). **A Plasma-Derived Protein-Metabolite Multiplexed Panel for Early-Stage Pancreatic Cancer.** *JNCI: Journal of the National Cancer Institute,* 111(4), 372–379.

PDF **NEWS**

Guida, F., Sun, N., Bantis, L. E., Muller, D. C., Li, P., Taguchi, A., Dhillon, D., Kundnani, D. L., Patel, N. J., Yan, Q., Byrnes, G., Moons, K. G. M., Tjønneland, A., Panico, S., Agnoli, C., Vineis, P., Palli, D., Bueno-De-Mesquita, B., Peeters, P. H., … Hanash, S. M. (2018). **Assessment of Lung Cancer Risk on the Basis of a Biomarker Panel of Circulating Proteins**. *JAMA Oncology*, 4(10), 182078.

NEWS

Capello, M., Bantis, L. E., Scelo, G., Zhao, Y., Li, P., Dhillon, D. S., Patel, N. J., Kundnani, D. L., Wang, H., Abbruzzese, J. L., Maitra, A., Tempero, M. A., Brand, R., Brennan, L., Feng, E., Taguchi, I., Janout, V., Firpo, M. A., Mulvihill, S. J., … Hanash, S. M. (2017). **Sequential Validation of Blood-Based Protein Biomarker Candidates for Early-Stage Pancreatic Cancer.** *Journal of the National Cancer Institute*, 109(4), djw266.

PDF **NEWS**

Conference Papers

Makoto Kobayashi, Katayama, H., Xu, H., Vykoukal, J. V, Fahrmann, J. F., Kundnani, D. L., Wang, H., Celestino, J., Liu, J., Lu, K. H., & Hanash, S. M. (2019). **In-depth proteomics profiling of ovarian cancer ascites-derived tumor cells for therapeutic target discovery.** , JPrOS JES 2019.

PDF

Web Posts

Kundnani, D., Thomas, S., Ulukaya, G. B., Kesar, D., Feldman, J., & Duan, J. (Nicole). (2019). **Differential gene expression in lung cancer cell lines between wildtype and mutant/variant p53**. *Biology Computes | Genomics and Bioinformatics at Georgia Tech.*

Kesar, D., Kundnani, D., Feldman, J., Thomas, S. T., Ulukaya, G. B., & Duan, J. (Nicole). (2019). **Exome Analysis of Utah Resident with Northern and Western European Ancestry.** *Biology Computes | Genomics and Bioinformatics at Georgia Tech.*

Presentations and Lectures

Oral Presentations

Kundnani, D. L., Marsili, S., Tichon, A., & Storici, F. (2022) **Expression correlation of RNASEH2A in cancer datasets confirms its association with cancer proliferation and specific cell cycle markers,** Global Virtual Congress on Cancer research & Drug Development - Cancer Research 2022

Kundnani D. L., Railkar S.**, Genetic Algorithms,** National Technical Paper Presentation, Institute of Electronical and Electronics Engineers - Engineering in Medicine & Biology Society(IEEE-EMBS), Mumbai - India, 2011 **Won Third Prize**

Poster Presentation

Kundnani, D. L., Marsili, S., Tichon, A., & Storici, F. (2021). Expression Correlation and Copy Number Alteration(CNA) Prevalence of Human RNASEH2A in cancer supports a role for RNASEH2A in cancer proliferation. The 26th Annual Meeting of the RNA Society - RNA 2021. **PDF** **Received NSF Conference AWARD**

Lectures / Workshops

Data Preprocessing and Dimensionality reduction in Biomedical and Clinical settings, Biostatistics, Georgia Institute of Technology, 2020

DNA sequencing and Phylogenetic Analysis, Genetics Lab, Georgia Institute of Technology, 2019

Time Management, Thadomal Shahani Engineering College, Mumbai - India, 2010

Water Purification Systems, BIOZEAL, Mumbai - India, 2009.

Teaching Experience

Course	Position/Title	Institute	Semester
Biostatistics (APPH-6225)	Teaching Assistant	Georgia Institute of Technology, USA	Summer 2020
Scientific Foundations of Health (APPH 1040)	Teaching Assistant	Georgia Institute of Technology, USA	Spring 2020
Genetics Lab (BIOL-2345)	Teaching Assistant	Georgia Institute of Technology, USA	Fall 2019

Applied Biotechnology (BIOT 5031)	Teaching Assistant	University of Houston – Clear Lake, USA	Fall 2014
Mammalian Cell Culture Techniques	Teaching Assistant	Usha Biotech, India	Spring 2013

Mentoring Experience

Research mentor for M.S. Bioinformatics Students 2021-present
Georgia Institute of Technology
Both mentees have been awarded Graduate Research assistantship for their work

Professional Training

ISO 9001:2008 Rules and Regulations 2015
Ansh Labs, USA

Mammalian Cell Culture and Molecular Cloning Techniques 2012
Usha Biotech, India

Applications of Immunology in Health and Medicine 2011
Haffkine Institute, India

Workings of Clinical Research, 2010
Institute of Clinical Research, India

Professional Affiliations

Institute of Electrical and Electronics Engineers – Engineering in Medicine & Biology Society(IEEE-EMBS), member 2021-Present

RNA Society, member 2021-Present

American Association for the Advancement of Science (AAAS), member 2020-Present

International Society for Computational Biology (ISMB) , member 2019-Present

Association for Women in Science, Gulf Coast Houston (AWIS-GCH), member 2014-2019

Institute of Electrical and Electronics Engineers – Engineering in Medicine & Biology Society(IEEE-EMBS), member 2009-2010

Professional Service

Member of Georgia Tech **Bioinformatic PhD Orientation Panel** 2021

Member of Georgia Tech **Bioinformatics T-shirt committee** 2021

Assisted in Storici Lab's **Grant Writing** 2021

Assisted with **Article Review** 2019 - Present

- Penghao Xu, Francesca Storici, Frequency and patterns of ribonucleotide incorporation around autonomously replicating sequences in yeast reveal the division of labor of replicative DNA polymerases, *Nucleic Acids Research*, Volume 49, Issue 18, 11 October 2021, Pages 10542–10557,
- Gombolay, A.L., Storici, F. Mapping ribonucleotides embedded in genomic DNA to single-nucleotide resolution using Ribose-Map. Nat Protoc (2021).
- El-Sayed, W. M. M., Gombolay, A. L., Xu, P., Yang, T., Jeon, Y., Balachander, S., Newnam, G., Tao, S., Bowen, N. E., Brůna, T., Borodovsky, M., Schinazi, R. F., Kim, B., Chen, Y., & Storici, F. (2021). Disproportionate presence of adenosine in mitochondrial and chloroplast DNA of Chlamydomonas reinhardtii. IScience, 24(1), 102005.

Community Service

Appleton's Molecular BioMedical (MBM), Founding Student member 2022-Present
Organize and invite external Faculty for cancer related talk series

SKY at Georgia Tech, President 2022-Present
Making comprehensive well-being and resilience programs available to university students

ASHA for Education(Atlanta), Secretary 2020-2022
Raising funds for education of disadvantaged children

National Service Scheme(India) - Blood Donation Camps, Volunteer 2009-2011
Helping run Blood donation Camps

Skills

Programming: R, Bioconductor, Python, Bash, MATLAB, MySQL, C++,HTML, Markdown

Applications: SPSS, GraphPad prism, Excel, Tableau, Mendeley, AutoCAD, Adobe Illustrator

Platforms and Environments: Linux, Windows OS, Visual Studio Code, Sublime, Jupyter and Google Colab

Spoken Languages: English, Hindi, Sanskrit

Other

Citizenship: Indian