

Curriculum Vitae

Tamal Das, PhD

Associate Professor

Tata Institute of Fundamental Research Hyderabad (TIFRH)
Sy. 36/P, Gopanapally, Serilingampally,
Hyderabad – 500046, Telangana, India
Phone: +91-040-2020-3079 (Office), +91-9433543507 (Mob.)
Email: tdas@tifrh.res.in



EDUCATION

Doctor of Philosophy, 2010, Indian Institute of Technology Kharagpur, India

- *Thesis topic: Stress Responsive Dynamics of Mammalian Cells in Microconfinements.*
- *Supervisors: Prof. Suman Chakraborty (Mech.), Prof. Tapas K. Maiti (Biotech.)*

Integrated Bachelor and Master of Technology, 2006, Indian Institute of Technology Kharagpur, India

- *Department: Biotechnology*
- *Institute Silver Medal* for the highest cumulative grade point average in the department

RESEARCH INTERESTS

Mechanobiology, Biophysics, Collective Cell Dynamics

Mission: Understanding how mechanical and geometric factors interact with molecular signaling to influence how polarized epithelial tissues originate, fold, regenerate, and repair while maintaining their integrity.

ACADEMIC AND PROFESSIONAL EXPERIENCE

2022-present	Associate Professor, Tata Institute of Fundamental Research Hyderabad, India
2016-2022	Reader-F, Tata Institute of Fundamental Research Hyderabad, India
2015-2016	Project leader, Max Planck Institute for Intelligent Systems, Stuttgart, Germany
2011-2015	Postdoctoral researcher, Max Planck Institute for Intelligent Systems, Stuttgart, Germany

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2010-2011	Postdoctoral researcher, Institut du Cancer de Montréal, Centre Hospitalier de l'Université de Montréal (CHUM), Montréal, Canada
2006-2010	Ph.D. in Biotechnology, Department of Biotechnology, Indian Institute of Technology Kharagpur, India
2001-2006	Integrated Bachelor and Master of Technology, Department of Biotechnology, Indian Institute of Technology Kharagpur, India

RESEARCH GRANTS

- ❖ *Research Grant, “Dynamics of multilayer epithelial structures: Integrative mechanical characterization of epidermis”, Human Frontier Science Program (HFSP), USD 1,140,000.00 (≈ 9 Cr INR), 2022-2025, PI (along with 2 co- PIs)*
- ❖ *Core Research Grant, “Mechanobiology of micron-scale curvature sensing during epithelial gap closure: Uncovering the role of the endoplasmic reticulum”, Science and Engineering Research Board (SERB) India, INR 7,224,325.00 (≈ 72 lac INR), 2021-2024, PI*
- ❖ *Intermediate Fellowship, “Mechanobiology of cell competition: Elucidating the role of mechanical forces in cell-cell sensing and collective fitness measurement towards tumor suppression in epithelial tissues”, DBT- Wellcome Trust India Alliance, INR 35,235,200.00 (≈ 3.5 Cr INR), 2018- 2022, PI*
- ❖ *Partner Group Award, “Collective cell migration”, the Max Planck Society (Germany), EUR 100,000.00 (≈ 80 lac INR), 2017-2022, PI*

AWARDS / DISTINCTIONS

2022	INSA Medal for Young Scientists BM Udgaonkar Excellence in Teaching Award
2017	Intermediate Fellowship by the Department of Biotechnology (DBT India)/ Wellcome Trust (UK) India Alliance
2016	Partner Group award by the Max Planck Society, Germany
2006	Innovative Student Projects Award by the Indian National Academy of Engineering (INAE)

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	Institute Silver Medal for securing the highest cumulative grade point average in the Department of Biotechnology, Indian Institute of Technology Kharagpur, India Best Master Thesis Award in the Department of Biotechnology, Indian Institute of Technology Kharagpur, India
2004	J.C. Ghosh Memorial Award for outstanding academic performance, Indian Institute of Technology Kharagpur, India

PROFESSIONAL MEMBERSHIPS

- Biophysical Society (since 2023)
- Indian Biophysical Society (since 2018)
- Indian Society for Developmental Biologists (since 2022)

PREPRINTS/JOURNAL PUBLICATIONS/BOOK CHAPTERS

Preprints	<p>R. Marwaha, S. Rawal, P. Khuntia, S. Banerjee, D. Manoj, M. Jaiswal, and T. Das, <i>Mechanosensitive dynamics of lysosomes along microtubules regulate leader cell emergence in collective cell migration</i>. bioRxiv, 2023. DOI: https://doi.org/10.1101/2022.08.03.502740 (Under review in <i>Nature Cell Biology</i>)</p> <p>P. Gupta, S. Kayal, S.P. Pothapragada, H.K. Senapati, P. Devendran, D. Bi, and T. Das. <i>Mechanical imbalance between normal and cancer cells drives epithelial defense against cancer</i>. bioRxiv, 2023. DOI: https://doi.org/10.1101/2023.09.27.559723 (Under review in <i>PNAS</i>)</p> <p>P. Daga, B. Thurakkal, S. Rawal, and T. Das, <i>Matrix stiffening promotes perinuclear clustering of mitochondria</i>. bioRxiv, 2023. DOI: https://doi.org/10.1101/2023.06.29.547150 (Under review in <i>Molecular Biology of the Cell - MBoC</i>)</p>
2024	P. Khuntia and T. Das , <i>Prediction of Golgi polarity in collectively migrating epithelial cells using graph neural network</i> . Cells Tissues Organs , 2024, 213: p. 108-119.

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2023	B. Thurakkal, K. Hari, R. Marwaha, S. Karki, M. K. Jolly, and T. Das , <i>Collective heterogeneity of mitochondrial potential in contact inhibition of proliferation</i> . Biophysical Journal , 2023, 122: p. 3909-3923.
2022	<p>P. Khuntia, S. Rawal, R. Marwaha, and T. Das, <i>Actin-driven Golgi apparatus dispersal during collective migration of epithelial cells</i>. PNAS, 2022, 119: p. e2204808119.</p> <p>S.P. Pothapragada, P. Gupta, S. Mukherjee, and T. Das, <i>Matrix mechanics regulates epithelial defence against cancer by tuning dynamic localization of filamin</i>. Nature Communications, 2022, 13: p. 218 [*Selected for Nature Communications' focus articles on Cancer]</p>
2020	<p>M. Vishwakarma, J. P. Spatz, and T. Das, <i>Mechanobiology of leader– follower dynamics in epithelial cell migration</i>. Current Opinion in Cell Biology, 2020, 66: p. 97–103.</p> <p>M. Vishwakarma, B. Thurakkal, J. P. Spatz, and T. Das, <i>Dynamic heterogeneity influences the leader-follower dynamics during epithelial wound closure</i>. Philosophical Transactions of the Royal Society B, 2020, 375: p. 20190391(1-10).</p>
2018	<p>M. Vishwakarma, J. Di Russo, D. Probst, U. Schwarz, T. Das*, and J. P. Spatz*, <i>Mechanical interactions among followers determine the emergence of leaders in migrating epithelial cell collectives</i>. Nature Communications, 2018, 9: p. 3469. *Co-corresponding authors</p>
2016	<p>T. Das and J. P. Spatz, <i>Getting a grip on collective cell migration</i>. Nature cell biology, 2016, 18(12): p. 1265-1267.</p> <p>F. Lussier, T. Brulé, M. Vishwakarma, T. Das, J. P. Spatz, and J-F. Masson, <i>Dynamic-SERS Optophysiology: A Nanosensor for Monitoring Cell Secretion Events</i>. Nano Letters, 2016, 16(6): p. 3866- 3871.</p>
2015	<p>M. Raoufi*, T. Das*, I. Schön, V. Vogel, D. Brüggemann, and J.P. Spatz, <i>Nanopore diameters tune strain in extruded fibronectin fibers</i>. Nano Letters, 2015. 15(10): p. 6357–6364. *Equal contributions</p> <p>T. Das, K. Safferling, S. Rausch, N. Grabe, H. Boehm, and J.P. Spatz, <i>A molecular mechanotransduction pathway regulates collective migration of epithelial cells</i>. Nature Cell Biology, 2015. 17(3): p. 276- 87.</p>
2014	B. Roy, T. Das , D. Mishra, T.K. Maiti, and S. Chakraborty, <i>Oscillatory shear stress induced calcium flickers in osteoblast cells</i> . Integrative Biology , 2014. 6(3): p. 289-99.

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	<p>B. Roy, G. Chattopadhyay, D. Mishra, T. Das, S. Chakraborty, and T.K. Maiti, <i>On-chip lectin microarray for glycoprofiling of different gastritis types and gastric cancer</i>. Biomicrofluidics, 2014. 8(3): p. 034107.</p>
2013	<p>S. Rausch, T. Das, J.R. Soine, T.W. Hofmann, C.H. Boehm, U.S. Schwarz, H. Boehm, and J.P. Spatz, <i>Polarizing cytoskeletal tension to induce leader cell formation during collective cell migration</i>. Biointerphases, 2013. 8(1): p. 32.</p> <p>T. Das, L. Meunier, L. Barbe, D. Provencher, O. Guenat, T. Gervais, and A.M. Mes-Masson, <i>Empirical chemosensitivity testing in a spheroid model of ovarian cancer using a microfluidics-based multiplex platform</i>. Biomicrofluidics, 2013. 7(1): p. 11805.</p> <p>T. Das, T.K. Maiti, and S. Chakraborty, <i>Flow Shear Induced Changes in Membrane Fluidity: Dependence on Cell-Substrate Adhesion Strength</i>. Current Analytical Chemistry, 2013. 9(1): p. 9-15.</p> <p>T. Das and S. Chakraborty, <i>Perspective: Flicking with flow: Can microfluidics revolutionize the cancer research?</i> Biomicrofluidics, 2013. 7(1): p. 11811.</p>
2012	<p>R. Dey, T. Das, and S. Chakraborty, <i>Frictional and Heat Transfer Characteristics of Single-Phase Microchannel Liquid Flows</i>. Heat Transfer Engineering, 2012. 33(4-5): p. 425-446.</p> <p>T. Das, D. Carugo, X.L. Zhang, and S. Chakraborty, <i>Oscillation dynamics of embolic microspheres in flows with red blood cell suspensions</i>. Journal of Applied Physics, 2012. 112(12).</p> <p>N. Bose, T. Das, D. Chakraborty, T.K. Maiti, and S. Chakraborty, <i>Enhancement of static incubation time in microfluidic cell culture platforms exploiting extended air-liquid interface</i>. Lab on a chip, 2012. 12(1): p. 69-73.</p> <p>S.K. Biswas, T. Das, and S. Chakraborty, <i>Nontrivial augmentations in mixing performance through integrated active and passive mixing in serpentine microchannels</i>. Journal of Applied Physics, 2012. 111(5).</p> <p>I. Banerjee, D. Mishra, T. Das, and T.K. Maiti, <i>Wound pH-Responsive Sustained Release of Therapeutics from a Poly(NIPAAm-co-AAc) Hydrogel</i>. Journal of Biomaterials Science-Polymer Edition, 2012. 23(1- 4): p. 111-132.</p> <p>I. Banerjee, D. Mishra, T. Das, S. Maiti, and T.K. Maiti, <i>Caprine (goat) collagen: a potential biomaterial for skin tissue engineering</i>. Journal of Biomaterials Science-Polymer edition, 2012. 23(1-4): p. 355-73.</p>

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2011	<p>B. Roy, T. Das, T.K. Maiti, and S. Chakraborty, <i>Effect of fluidic transport on the reaction kinetics in lectin microarrays</i>. Analytica Chimica Acta, 2011. 701(1): p. 6-14.</p> <p>S. Ghosh, T. Das, S. Chakraborty, and S.K. Das, <i>Predicting DNA- mediated drug delivery in interior carcinoma using electromagnetically excited nanoparticles</i>. Computers in Biology and Medicine, 2011. 41(9): p. 771-779.</p> <p>T. Das, T.K. Maiti, and S. Chakraborty, <i>Augmented stress-responsive characteristics of cell lines in narrow confinements</i>. Integrative Biology, 2011. 3(6): p. 684-695.</p> <p>T. Das, T.K. Maiti, and S. Chakraborty, <i>Nanodomain stabilization dynamics in plasma membranes of biological cells</i>. Physical Review E, 2011. 83(2).</p>
2009	<p>B.B. Mandal, T. Das, and S.C. Kundu, <i>Non-bioengineered silk gland fibroin micromolded matrices to study cell-surface interactions</i>. Biomedical Microdevices, 2009. 11(2): p. 467-476.</p> <p>T. Das, S. Das, and S. Chakraborty, <i>Influences of streaming potential on cross stream migration of flexible polymer molecules in nanochannel flows</i>. Journal of Chemical Physics, 2009. 130(24).</p> <p>T. Das and S. Chakraborty, <i>Biomicrofluidics: Recent trends and future challenges</i>. Sadhana-Academy Proceedings in Engineering Sciences, 2009. 34(4): p. 573-590.</p>
2008	<p>T. Das, T.K. Maiti, and S. Chakraborty, <i>Traction force microscopy on- chip: shear deformation of fibroblast cells</i>. Lab on a Chip, 2008. 8(8): p. 1308-1318.</p> <p>T. Das and S. Chakraborty, <i>A generalized Langevin formalism of complete DNA melting transition</i>. Europhysics Letters, 2008. 83(4).</p>
2007	<p>T. Das, S.K. Mallick, D. Paul, S.K. Bhutia, T.K. Bhattacharyya, and T.K. Maiti, <i>Microcontact printing of Concanavalin A and its effect on mammalian cell morphology</i>. Journal of Colloid and Interface Science, 2007. 314(1): p. 71-79.</p> <p>T. Das, D. Ghosh, T.K. Bhattacharyya, and T.K. Maiti, <i>Biocompatibility of diamond-like nanocomposite thin films</i>. Journal of Materials Science- Materials in Medicine, 2007. 18(3): p. 493-500.</p> <p>S. Chakraborty, T. Das, and S. Chatteraj, <i>A generalized model for probing frictional characteristics of pressure-driven liquid microflows</i>. Journal of Applied Physics, 2007. 102(10).</p>

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2006	<p>T. Das and S. Chakraborty, <i>Helicase mediated active DNA unwinding in a stochastic field</i>. Applied Physics Letters, 2006. 89(15).</p> <p>S. Das, T. Das, and S. Chakraborty, <i>Modeling of coupled momentum, heat and solute transport during DNA hybridization in a microchannel in the presence of electro-osmotic effects and axial pressure gradients</i>. Microfluidics and Nanofluidics, 2006. 2(1): p. 37-49.</p> <p>S. Das, T. Das, and S. Chakraborty, <i>Analytical solutions for the rate of DNA hybridization in a microchannel in the presence of pressure-driven and electroosmotic flows</i>. Sensors and Actuators B-Chemical, 2006. 114(2): p. 957-963.</p>
Book Chapters	<p>“<i>Cellular biomicrofluidics: on the effect of microconfinement</i>” by T. Das, T.K. Maiti, and S. Chakraborty in book titled “<i>Microfluidics and Microscale Transport Processes</i>”, Ed. S. Chakraborty, CRC Press (Taylor & Francis), 2013.</p> <p>“<i>Bio-microfluidics: overview</i>” by T. Das and S. Chakraborty in the book titled “<i>Microfluidics and Microfabrication</i>”, Ed. S. Chakraborty, Springer, 2010.</p>