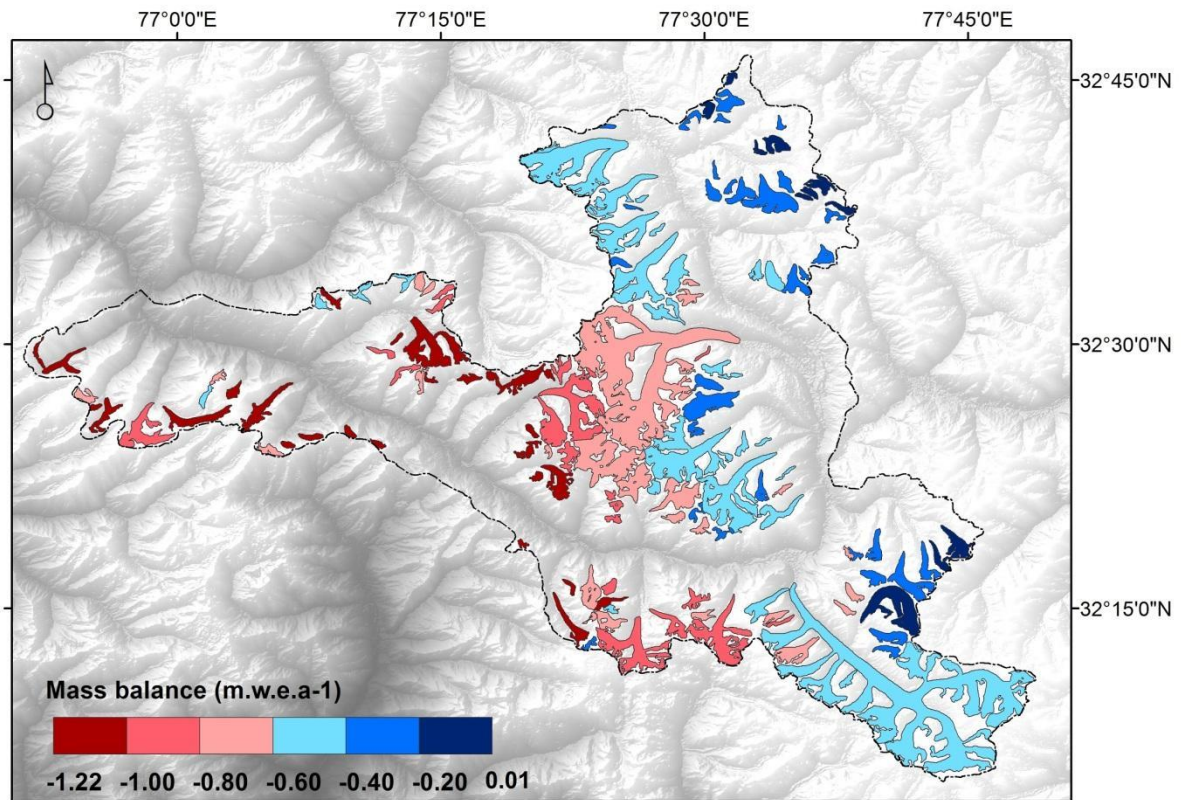


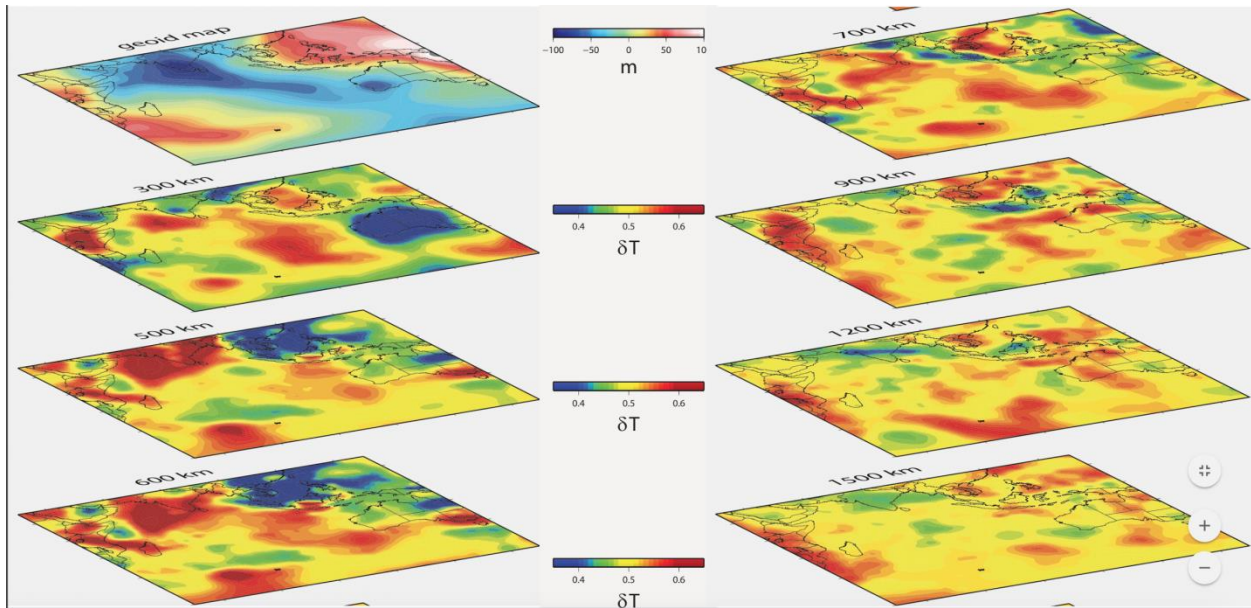
1. Anil Kulkarni (DCCC)



A glacier mass balance model using temperature, precipitation and Accumulation Area Ratio was developed. An annual mass loss from 1982 to 2012 for 146 glaciers covering an area of 637 sq km in Chandra basin, Himachal Pradesh was estimated. An overall loss of 18% was estimated, however small and low altitude glaciers lost almost 70% of glacier stored water, indicating looming water scarcity for the villagers in the valley

Reference: Sayli Tawde, **AV Kulkarni**, G Bala (2017) An estimate of glacier mass balance for the Chandra basin, western Himalaya, for the period 1984-2012. *Annals of Glaciology*. 1-11. doi: 10.1017/aog. 2017.18

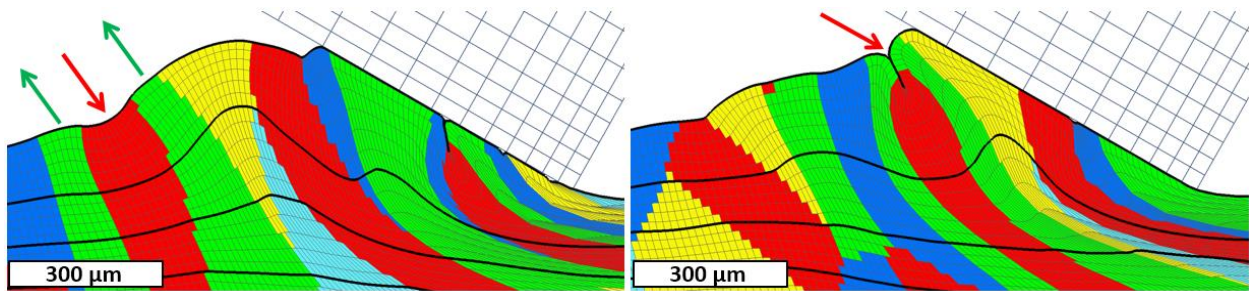
2. Attreyee Ghosh (CEaS)



The most negative geoid anomaly on Earth lies in the Indian Ocean. So far, there has been no agreement regarding the source of this anomalous low. The current study finds that upper to mid-mantle low density (high temperature) structures are mainly responsible for the formation of this anomaly. The figure shows modeled geoid and temperature variations inside the Earth at various depths.

Reference: A Ghosh, G Thyagarajulu, B Steinberger (2017) The Importance of Upper Mantle Heterogeneity in Generating the Indian Ocean Geoid Low. *Geophys. Res. Lett.* 44, 9707-9715.

3. Narayan Sundaram (Civil Eng)

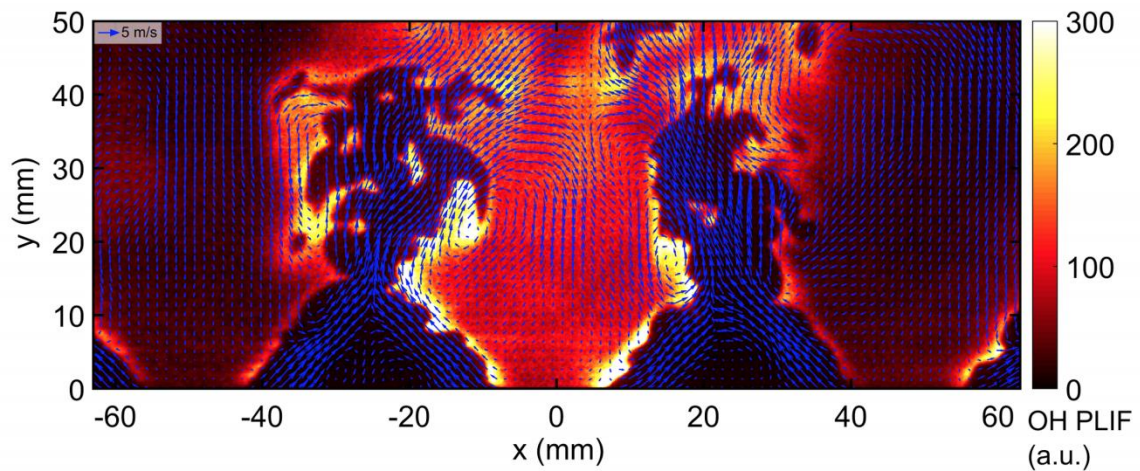


Microstructural effects can produce unexpected surface damage during deformation processing of metals via surface fold formation. Two frames from a finite element (FE) simulation depicting a surface depression (a), which then forms a surface fold (b), in sliding of aluminum-1100 modeled as a heterogeneous polycrystalline aggregate. The fold eventually becomes a crack-like damage feature on the residual surface.

Reference: NK Sundaram, A Mahato, Y Guo, K Viswanathan, S Chandrasekhar (2017) *Acta Mat* 140: 67-78.

Two frames from a finite element (FE) simulation of Microstructural effects, depicting a surface depression (a), which then forms a surface fold (b), in sliding of aluminum-1100 modeled as a heterogeneous polycrystalline aggregate

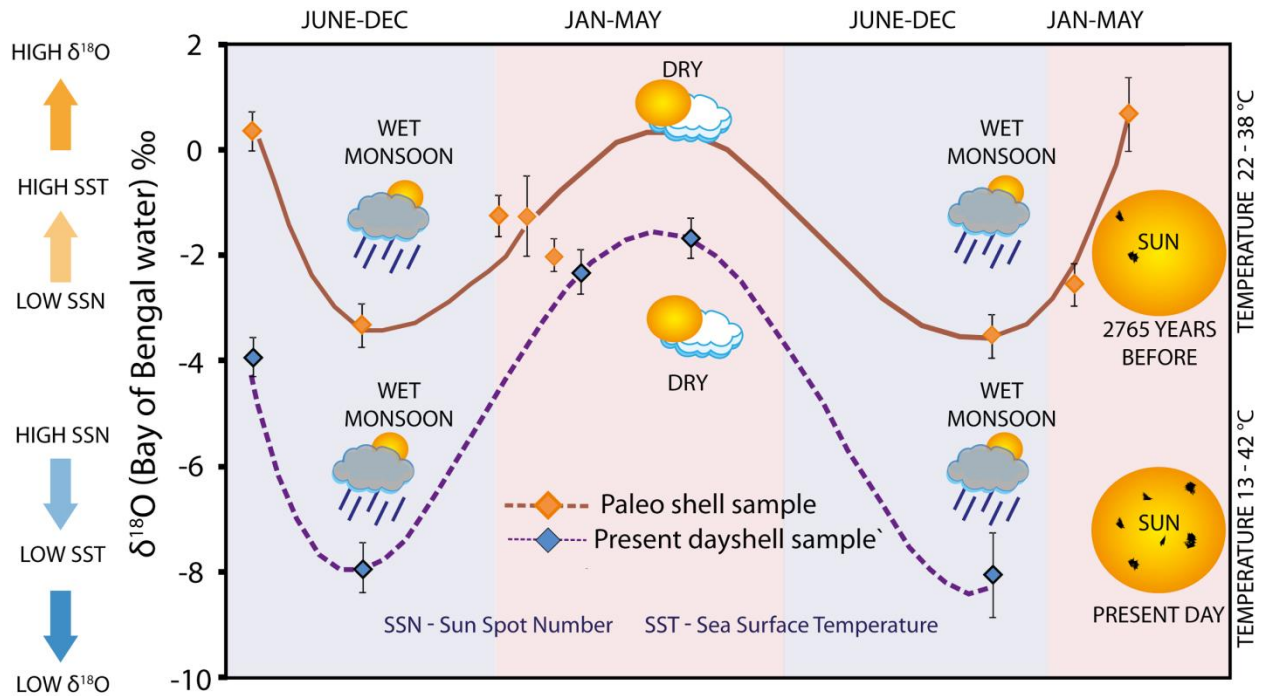
4. Swetaprovo Chaudhuri (AE)



The image captures the instantaneous velocity and reactive species fields inside a model gas turbine combustor. This is experimentally obtained by simultaneous Particle Image Velocimetry and Planar Laser Induced Fluorescence of hydroxyl (OH) radical. In the image, the blue arrows represent flow velocity vectors corresponding to the turbulent swirling flow and the color scale represents the OH fluorescence intensity, respectively.

Reference: RB Vishwanath, PM Tilak, and **S Chaudhuri**. An Experimental Study of Interacting Swirl Flows in a Model Gas Turbine Combustor, *Experiments in Fluids*, In Press. DOI: 10.1007/s00348-018-2495-2

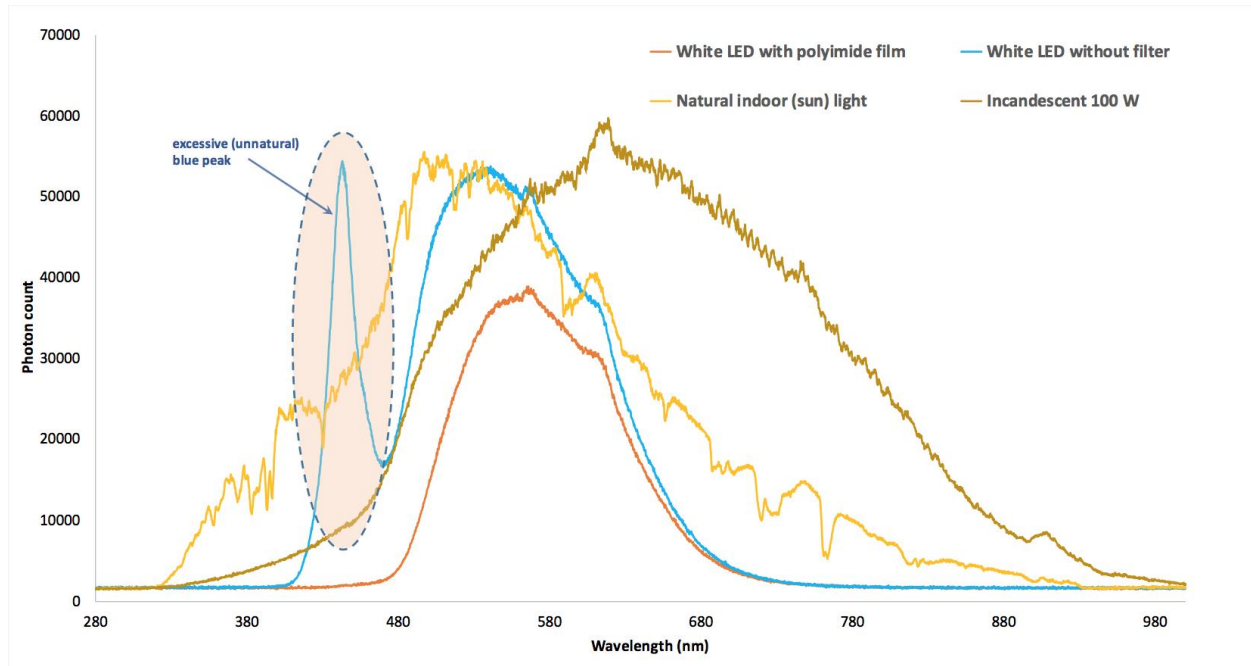
5. Prosenjit Ghosh (CeaS)



A study on mollusc shells collected from the Hendri Island of Bay of Bengal revealed growth features denoting seasonal bands recording water temperature and salinity. These findings documented paleo seasonal hydrological condition near the mouth of Ganga Brahmaputra river system during 2765 ± 130 years; marking a time of solar minima. Evidences suggests warming of coastal environment due to the presence of marine warm pool during solar minima as compared to the present day.

Reference: Y Banerjee, P Ghosh, R Bhushan, P Rahul (2017) Strong sea forcing and warmer winter during solar minima ~ 2765 yr B.P. recorded in the growth bands of *Crassostrea* sp. from the confluence of river Ganges, Eastern India. *Quaternary International* (In Press)

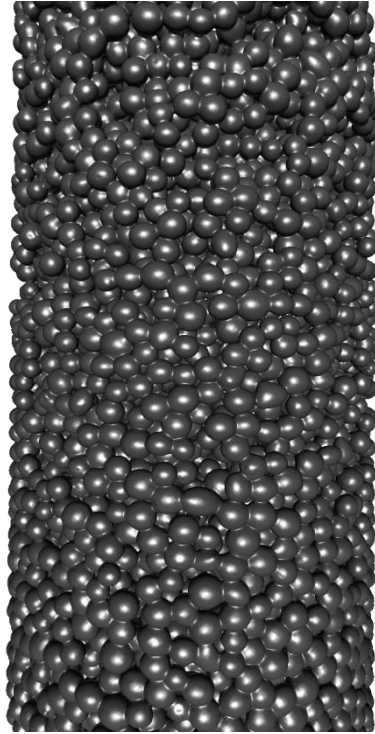
6. Monto Mani (CST)



Commercial Cool White LEDs are presumed environment friendly (luminous efficacy >90 lm/W) but with detrimental impacts on vision and increased stress due to the unnatural blue peak (400-460 nm). Current research led to the identification of an affordable solution, based on a stable polyimide film, being adopted by many luminaire companies, health-care practitioners and in IISc.

Reference: M Manish, RR Rao, P Ramamurthy, and M **Mani**. Safety of Light Emitting Diode (LED) based Domestic Lighting: Rural Context. *International RuTAG Conference on Rural Technology Development and Delivery*, March 9-11, 2018, IIT Delhi

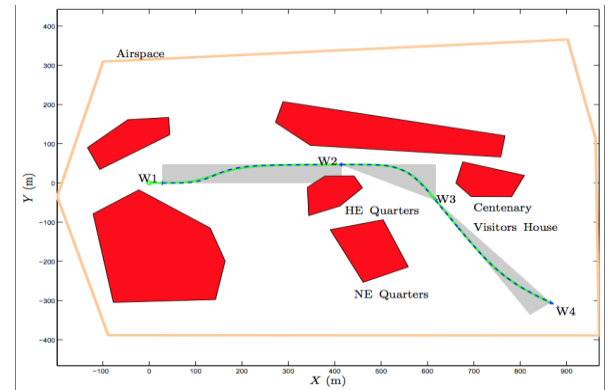
7. Tejas Murthy (Civil Eng)



Naturally occurring geomaterials such as sandstones, soft rocks, are comprised of particulates, often held together by cohesion between them. The geology, surrounding environs bring forth this cohesion between the particulates. We study the structure and mechanical behaviour of such cohered granular materials at multiple length scales. The figure presents an x-ray computed tomography image of a cemented granular ensemble.

Reference: S Singh, RK Kandasami, RK Mahendran., and **TG Murthy** (2017) System size effects on the mechanical response of cohesive-frictional granular ensembles, EPJ Web Conf., 140: 08007, doi: 10.1051/epjconf/201714008007

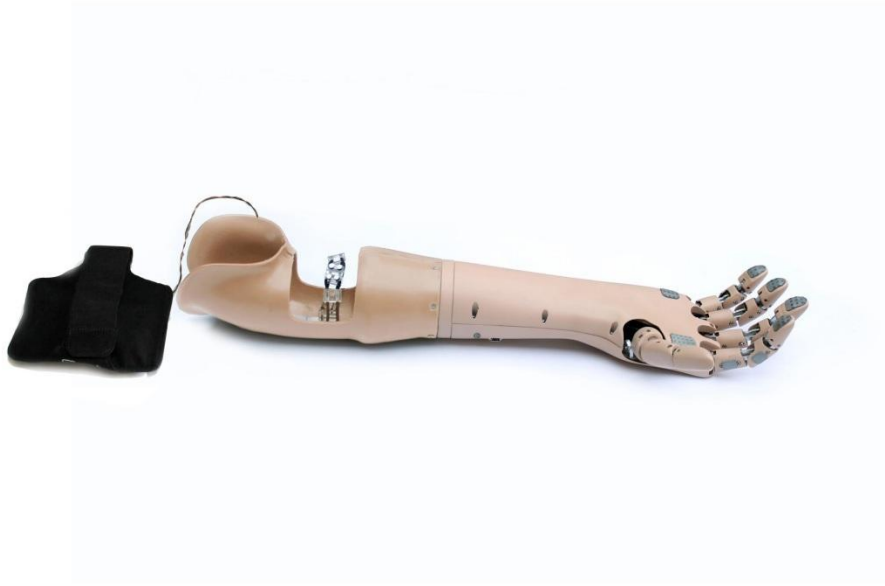
8. Ashwini Ratnoo (AE)



The figure above showcases results from a novel continuous curvature path planning methodology for Unmanned Aerial Vehicles (UAVs) developed using four parameter logistic curves. Fig A presents the scenario with an airspace defined in the IISc north area and restrictions within the airspace modeled as convex polygons. Fig B presents the planned (dashed curve) and followed path (solid line) connecting four waypoints using a simulation.

Reference: S Upadhyay and A Ratnoo (2017) Smooth Path Planning for Unmanned Aerial Vehicles with Airspace Restrictions. *AIAA Journal of Guidance, Control, and Dynamics*, 40(7): 1596-1612

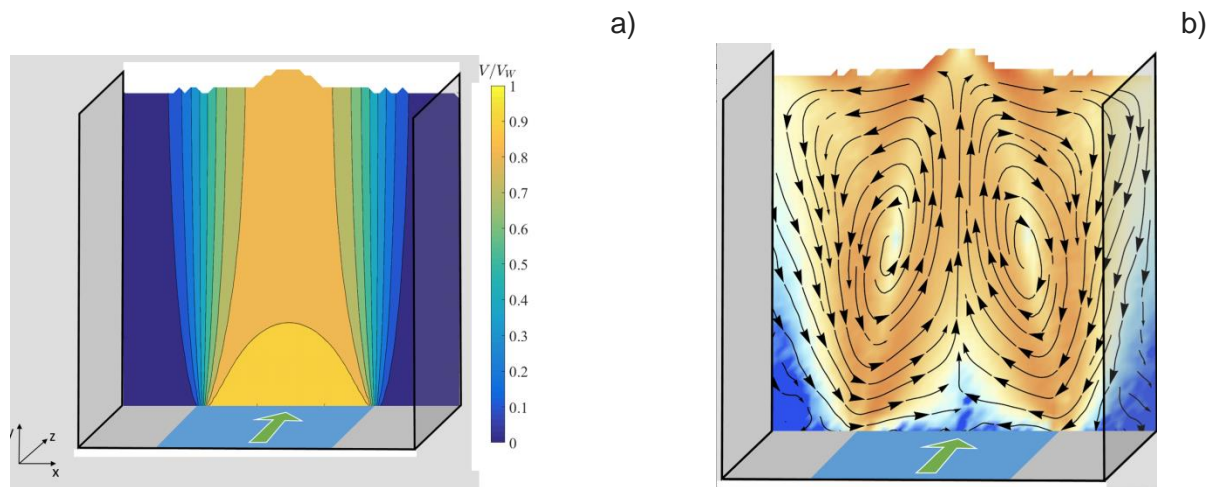
9. Dibakar Sen (CPDM)



Developed with funding from Wellcome Trust (UK), PURAK-prosthesis provides *functionality with affordability*. With its *single* motor driven fully articulated structure controlled by a novel *myo-mechanical* control interface, it can adaptively grasp arbitrary shapes and let the user *feel the grasp force* too! It weighs just 500gm and costs less than a 10th of its competition.

Reference: Patent 1554/CHE/2013, Design 287834

10. Prabhu Nott (CHEM ENG)



The shear of dense granular materials is accompanied by density reduction, leading to anomalous mechanical response. Here a granular material sheared in a split-bottom Couette cell, wherein a section of the base (blue) moves with velocity V_w relative to the stationary walls (grey), exhibits a dilation-driven secondary flow: (a) primary velocity (z direction), (b) secondary velocity in the x-y plane.

Reference: PV Dsouza, KP Krishnaraj and PR Nott (2017) Secondary flows in slow granular flows, *Powders and Grains. EPJ Web of Conferences*. 140: 03028. DOI: 10.1051/epjconf/201714003028