Abhijit Sinha Roy

Chief Scientist, Imaging, Biomechanics and Mathematical Modeling Solutions,
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EDUCATION

Ph.D.	Mechanical Engineering, University of Cincinnati, USA.	2004-2007
M.S.	Mechanical Engineering, University of Cincinnati, USA.	2002–2004
B.E.	Mechanical Engineering, University of Pune, India.	1998-2002

EXPERIENCE

Chief Scientist, Imaging, Biomechanics and Mathematical Modeling Solutions, **Feb 2013-Present**
Narayana Nethralaya Foundation, Bangalore, India
- Lead research on mathematical simulation (CFD and soft tissue mechanics) of clinical models of ocular diseases
- Lead research on laser-based treatment of refractive, cataract and corneal disorders
- Develop novel clinical imaging based diagnostic tools for ocular diseases

Senior Research Associate, Cleveland Clinic Cole Eye Institute, Cleveland, OH **March, 2010-Feb, 2013**

Post-Doctoral Research Fellow, Cleveland Clinic Cole Eye Institute, Cleveland, OH **April, 2007- March, 2010**
- Soft tissue biomechanics, Imaging-based biomechanical tissue characterization
- Mechanics of biomaterials: Microstructure based material models, Inverse Finite Element Analysis (FEA)
- Patient-specific biomechanical analysis of laser-tissue interaction and ablation methods, collagen crosslinking
- Numerical Optimization for constitutive material model development, soft tissue mechanical property changes
- Design of experiments, experimental Techniques: tissue elasticity e.g. Instron, material characterization methods, Hyperelasticity, viscoelasticity, microstructure-based elasticity, anisotropy, constitutive model development
- Mechanical testing, protocol preparation, scientific and technical reports preparation
- Non-linear large deformation FEA using patient specific imaging derived topography and optical power analysis
- Pre-clinical and clinical study design (IRB) for device evaluation, execution, data analysis and statistics

Ph.D. Research Assistant, University of Cincinnati, OH **September, 2002- April, 2007**
- Experimental biofluid dynamics: transient flow experiments, model prototyping and testing: Interventional Cardiology
- Coronary hemodynamic flow analyses, cardiac flow simulation (Newtonian and non-Newtonian fluids, coupled physics), testing using physical and pre-clinical experimental model
- Real-time data acquisition and analyses using engineering sensors, clinical sensors and devices, LabView based experiment design, fabrication and testing: Interventional Cardiology
- Pre-clinical hemodynamic study design, execution, data acquisition, statistical analyses and computational modeling
- Advanced computational flow dynamics (CFD) and solid mechanics (CSD) for biomedical applications, multiphysics bioengineering model development, validation and parametric studies

Other related experience
- Pharmacokinetic analysis of drug distribution within human eye using realistic 3-D eye CFD model to evaluate drug release characteristics of biodegradable implants, analyzed comparative effect of linear and nonlinear assumptions on elimination of drug, both diffusion and convective transfer, from the eye.
- Developed *in vitro* pulsatile experimental flow loop for physiologic flow simulation in coronary obstructions
- Design of medical implantable devices using Fluid structure interaction computational models
- Pulsatile hemodynamic analysis of shear stress alterations in arterio-venous fistula
- Computational fluid dynamics validation of Particle Image Velocimetry data from reconstructed 3-D carotid artery model
- Design of membrane oxygenators: design methodologies and mass transfer requirements

COMPUTING SKILLS
- Analysis Tools: ABAQUS, ANSYS, FLUENT, ADINA, SciPy
- Graphical and Post-Processing: MS Office, TECPLOT, OriginLab, Adobe Illustrator
- Numerical Packages: MATLAB, MATHEMATICA, AXUM
- CAD Packages: GAMBIT, IDEAS, AutoCAD, ProEngineer, MIMICS, Ansys ICEM, AMIRA,TruGrid
- Statistical Packages: SAS, SPSS, Minitab, MedCalc
- Programming Languages: C, C++, FORTRAN, Python

AWARDS & HONOURS
- University Graduate Scholarship: University of Cincinnati, 2002–2007
- Graduate Research Assistantship: University of Cincinnati, 2003–2007

- Summer Research Fellowship 2003 and 2004: University of Cincinnati
- Invited Talk on Corneal Biomechanics, Refractive Surgery 360, L V Prasad Eye Institute, Hyderabad, 2013.
- Invited Talk on Corneal Aberrations, ASIA ARVO, October 28-31, New Delhi, 2014.
- Best paper award in Refractive surgery session at the annual meeting of Asia-pacific society of cataract and refractive surgery, 2015.
- ARVO 2017, Travel Grant (Two as co-author)
- ARVO 2020, Travel Grant (One as co-author)
- ESCRS 2018, Travel Grant (One as co-author)
- World Corneal Congress 2020, Travel Grant (Three as co-author)

PROFESSIONAL ACTIVITIES
- Member of Association for Research in Vision and Ophthalmology, 2007–Present
- Reviewer for Journals: Journal of Refractive Surgery, Journal of Cataract and Refractive Surgery, American Journal of Ophthalmology, Investigative Ophthalmology and Visual Science, Xenotransplantation, Plos One, Journal of Engineering in Medicine, Journal of Biomechanics, Optometry and Vision Science, Molecular Vision, Eye, Current Eye Research.

FUNDED PROJECTS
- Title: Inverse estimation of material property changes following collagen cross-linking, Sponsored by Topcon Inc., USA. Duration: 2011-2012.
- Title: Biomechanical comparison of LASIK and SMILE procedures, Sponsored by Carl Zeiss Inc., USA. Duration: 2011-2012.
- Title: Development of image analysis platform for intraoperative optical coherence image guided surgery, Sponsored by Bioptigen Inc., USA, Duration: 2014-2015
- Title: Quantification of biomechanical changes after small incision lenticule extraction and laser assisted in-situ keratomileusis, Sponsored by Carl Zeiss Inc., Germany, Duration: 2014-2016.
- Title: Next- generation dynamic Scheimpflug imaging and biomechanical analytics for in vivo quantification of corneal viscoelasticity, Sponsored by Indo-German Science and Technology Center, Duration: 2015-2018
- Title: Comparison of next generation laser techniques for myopic correction: iDesign vs. SMILE, Sponsored by Abbott Medical Optics., USA, Duration: 2016-2018.
- Title: Customization of laser ablation profiles using Bowman's layer topography, Sponsored by Alcon Inc. USA, Duration: 2017-2019.
- Title: Quantifying correlation between visual outcomes and biomechanical changes in cornea in vivo after refractive surgery (LASIK and PRK), Sponsored by Indian Council of Medical Research India, Duration: 2017-2020.
- Title: Development of next-generation corneal crosslinking with artificial intelligence and biomechanical modeling, Sponsored by Indo-Dutch Call for Affordable medical devices and healthcare, Duration: 2018-2022
- Title: a) Assessment of quality of vision after SMILE at different energy settings (low light performance, questionnaire of patient experience); b) Epithelium thickness distribution and Bowman's topography post-SMILE. Sponsored by Carl Zeiss Inc., Germany, Duration: 2018-2020
- Title: A biomechanical simulation platform to plan and assess refractive treatments on the cornea. Sponsored by Indo-Swiss Blue-Sky research. Duration: 2019-2023
- Title: Prospective studies on Carl Zeiss MEL 90 laser platform for refractive treatments with respect to biomechanics, quality of vision and aberrations. Duration: 2021-2024
- Title: Next generation customized corneal crosslinking device using spatial light modulator for treatment of keratoconus eyes. Duration: 2020-2023
- Title: Development of novel AI/ML algorithms linking dynamic retinal blood flow measurements with retinal disorders. Duration: 2021-2024

PATENTS
1. Title of Invention: **Whole-Eye Computational Model of the Eye**, Patent No: 12/429,149, Publish Date: August 27th, 2012.
2. Title of Invention: **Application of intraoperative tomographic image analysis for ophthalmic surgical planning**, Filed by Narayana Nethralaya Foundation, 2015. Application ID: 2658/CHE/2015
3. Title of Invention: **Quantification of Bowman's layer for diagnosis of disease and prognosis of treatments in the human cornea**, Filed by Narayana Nethralaya Foundation, 2015. Application ID: 6539/CHE/2015, PCT/IB2016/057422.
US patent application granted in 2021.
4. Title of Invention: **A system and method of artificial intelligence and tomography imaging of human cornea**. Filed by Narayana Nethralaya Foundation, 2017. Application ID: 201741008796, TEMP/E-1/8968/2017-CHE.
US patent application granted in 2021.

5. Title of Invention: ***A method to quantify the quality of corneal donor tissue for transplantation using tomography imaging***. Filed by Narayana Nethralaya Foundation, 2017. Application ID: TEMP/E-1/15839/2017-CHE.
6. Title of Invention: ***A method to quantify the corneal parameters to improve biomechanical modeling***. Filed by Narayana Nethralaya Foundation, 2018. Application ID: TEMP/E-1/7686/2018-CHE.
7. Title of Invention: ***A device to generate customizable light curing patterns for ophthalmic applications***. Filed by Narayana Nethralaya Foundation, 2019. Application ID: TEMP/E-1/30360/2019-CHE.
8. Title of Invention***: A system for advanced evaluation of progression of disease in ocular tissues***. Filed by Narayana Nethralaya Foundation, 2019. Application ID: TEMP/E1/11807/2020-CHE.

PUBLICATIONS

Book Chapter (Peer-Reviewed)
1. Banerjee RK, **Sinha Roy A**, Back LH. Coronary angioplasty and guidewire diagnostics. *Wiley Encyclopedia of Medical Devices and Instrumentation*; edited by John G. Webster, University of Wisconsin, 2nd Edition, John Wiley & Sons, 2006.

Peer reviewed journal publications
1. **Sinha Roy A**, Banerjee RK, Back LH, Back MR, Khoury SF, Millard RW. Delineating the guidewire flow obstruction effect in assessment of fractional flow reserve and coronary flow reserve measurements. *American Journal of Physiology: Heart and Circulatory Physiology*. 2005; 289: H392-H397.
2. Park J, Bungay PM, Lutz RJ, Augsburger JJ, Millard RW, **Sinha Roy A**, Banerjee RK. Evaluation of coupled convective-diffusive transport of drugs administered by intravitreal injection and controlled release implant. *Journal of Controlled Release.* 2005; 105: 279–295.
3. **Sinha Roy A**, Back LH, Banerjee RK. Guidewire flow obstruction effect on pressure drop-flow relationship in moderate coronary artery stenosis. *Journal of Biomechanics.* 2006; 39: 853-864.
4. Banerjee RK, **Sinha Roy A**, Back LH, Back MR, Khoury SF, Millard RW. Characterizing momentum change and viscous loss of a hemodynamic endpoint in assessment of coronary lesions. *Journal of Biomechanics.* 2007; 40(3): 652-62.
5. **Sinha Roy A**, Rontala RS, West K, Greenberg RK, Banerjee RK. In vitro measurement and calculation of drag force on iliac limb stentgraft in a compliant artery wall model. *Molecular and Cellular Biomechanics.* 2008; 4(4): 211-226.
6. **Sinha Roy A,** Back MR, Khoury SF, Schneeberger EW, Back LH, Velury VV, Millard RW, Banerjee RK**.** Functional and anatomical diagnosis of coronary artery stenoses. *Journal of Surgical Research*. 2008; 150: 24-33.
7. Krishnamoorthy M, Roy-Chaudhury P, Wang Y, **Sinha Roy A**, Zhang J, Khoury S, Munda R, Banerjee RK. Measurement of hemodynamic and anatomic parameters in a swine arteriovenous fistula model: a technical note with possibilities for the future. *Journal of Vascular Access*. 2008; 9(1): 28-34.
8. Krishnamoorthy MK, Banerjee RK, Wang Y, Zhang J, **Sinha Roy A**, Khoury SF, Arend LJ, Rudich S, Roy-Chaudhury P. Hemodynamic wall shear stress profiles influence the magnitude and pattern of stenosis in a pig AV fistula. *Kidney International*. 2008; 74(11): 1410-9.
9. **Sinha Roy A**, Back LH, Banerjee RK. Evaluation of compliance of arterial vessel using coupled fluid structure interaction analysis. *Molecular and Cellular Biomechanics*. 2008; 5(4): 229-246.
10. **Sinha Roy A**, Dupps WJ, Jr. Effects of altered corneal stiffness on native and post-LASIK corneal biomechanical behavior: A whole-eye finite element analysis. *Journal of Refractive Surgery*. 2009; 25(10): 875-87.
11. Thornton IL, Dupps WJ, Jr., **Sinha Roy A**, Krueger RR. Biomechanical effects of intraocular pressure elevation on optic nerve/lamina cribrosa before and after peripapillary scleral collagen crosslinking. *Investigative Ophthalmology and Visual Science*. 2009; 50(3): 1227-33.
12. Banerjee RK, Ashtekar KD, Effat MA, Helmy TA, Kim E, Schneeberger EW, **Sinha Roy A**, Gottliebson WM, Back LH. Concurrent assessment of epicardial coronary artery stenosis and microvascular dysfunction using diagnostic endpoints derived from fundamental fluid dynamics principles. *Journal of Invasive Cardiology*. 2009; 21(10): 511-17.
13. de Medeiros FW, **Sinha Roy A**, Alves MR, Wilson SE, Dupps WJ. Differences in the early biomechanical effects of hyperopic and myopic LASIK. *Journal of Cataract and Refractive Surgery*. 2009; 36(6): 947-53.
14. **Sinha Roy A**, Dupps WJ. Patient-Specific modeling of corneal refractive surgery outcomes and inverse estimation of elastic property changes. *ASME Journal of Biomechanical Engineering*, 2011; 133: 011002-1-10.
15. Ford MR, Dupps WJ Jr., Rollins AM, **Sinha Roy A**, Hu Zhilin. A method for optical coherence elastography of the cornea. *Journal of Biomedical Optics.* 2011; 16(1): 016005.
16. Ruberti JW, **Sinha Roy A,** Roberts CJ. Corneal biomechanics and biomaterials. *Annual Review of Biomedical Engineering*. 2011; 13: 269-95.
17. Medeiros FW, **Sinha Roy A**, Alves MR, Dupps WJ Jr. Biomechanical corneal changes induced by different flap thickness created by femtosecond laser. *Clinics*. 2011; 66(6): 1067-71.

18. Salomão MQ, Chaurasia SS, **Sinha Roy A**, Ambrósio R, Jr., Esposito A, Sepulveda R, Agrawal V, Wilson SE. Corneal wound healing after ultraviolet-A/riboflavin collagen cross-linking: a rabbit study. *Journal of Refractive Surgery*. 2011; 27(6): 401-7.

19. Ambrósio R, Jr, Caiado ALC, Guerra FP, Louzada R, **Sinha Roy A**, Luz A, Dupps WJ, Belin MW. Novel pachymetric parameters based on corneal tomography for diagnosing Keratoconus. *Journal of Refractive Surgery*. 2011; 27(10):753-758.

20. **Sinha Roy A**, Dupps WJ. Patient-Specific Computational Modeling of Keratoconus Progression and Differential Responses to Collagen Crosslinking. *Investigative Ophthalmology and Visual Science*. 2011; 52(12):9174-87.

21. Hong CW, **Sinha Roy A**, Schoenfiled L, McMahon JT, Dupps WJ. Collagenase-mediated tissue modeling of corneal ectasia and collagen cross-linking treatments. *Investigative Ophthalmology and Visual Science*. 2012; 53(4):2321-7.

22. Armstrong BK, Lin MP, Ford MR, Santhiago MR, Singh V, Grossman GH, Agrawal V, **Sinha Roy A**, Butler RS, Dupps WJ, Wilson SE. Biological and biomechanical responses to traditional epithelium-Off and transepithelial riboflavin-UVA crosslinking techniques in rabbits. *Journal of Refractive Surgery*. 2013; 29(5): 332-41.

23. **Sinha Roy A**, Rocha KM, Randleman JB, Stulting RD, Dupps WJ Jr. Inverse computational analysis of in vivo corneal elastic modulus change after collagen crosslinking for keratoconus. *Experimental Eye Research*. 2013; 113:92-104.

24. **Sinha Roy A**, Shetty R, Kummelil MK. Keratoconus: a biomechanical perspective on loss of corneal stiffness. *Indian J Ophthalmol*. 2013; 61(8):392-3.

25. Hallahan KM, **Sinha Roy A**, Ambrosio R Jr, Salomao M, Dupps WJ Jr. Discriminant value of custom ocular response analyzer waveform derivatives in keratoconus. *Ophthalmology*. 2014; 121(2): 459-68.

26. Battu R, Dabir S, Khanna A, Kumar AK, **Sinha Roy A**. Adaptive optics imaging of the retina. *Indian J Ophthalmol*. 2014 ; 62(1): 60-5.

27. Seven I, **Sinha Roy A**, Dupps WJ. Patterned corneal collagen crosslinking for astigmatism: Computational modeling study. *Journal of Cataract and Refractive Surgery*. 2014: 40: 943-953.

28. Ford MR, **Sinha Roy A**, Rollins AM, Dupps WJ. Serial biomechanical comparison of edematous, normal, and collagen crosslinked human donor corneas using optical coherence elastography. *Journal of Cataract and Refractive Surgery*. 2014; 40: 1041-1047.

29. **Sinha Roy A**, Dupps WJ, Roberts CJ. Comparison of biomechanical effects of small incision lenticule extraction (SMILE) and laser in situ keratomileusis (LASIK): a finite element analysis study. *Journal of Cataract and Refractive Surgery*. 2014; 40: 971-980.

30. Santhiago MR, Wilson SE, Hallahan KM, Smadja D, Lin M, Ambrosio R Jr, Singh V, **Sinha Roy A**, Dupps WJ Jr. Changes in custom biomechanical variables after femtosecond laser in situ keratomileusis and photorefractive keratectomy for myopia. *Journal of Cataract and Refractive Surgery*. 2014: 40: 918-928.

31. Tejwani S, Shetty R, Kurien M, Dinakaran S, Ghosh A, **Sinha Roy A**. Biomechanics of the Cornea Evaluated by Spectral Analysis of Waveforms from Ocular Response Analyzer and Corvis-ST. *PLoS One*. 2014; 9(8): e97591.

32. Hallahan KM, Rocha K, **Sinha Roy A**, Randleman JB, Stulting RD, Dupps WJ Jr. Effects of corneal cross-linking on ocular response analyzer waveform-derived variables in keratoconus and postrefractive surgery ectasia. *Eye Contact Lens*. 2014; 40(6): 339-44.

33. Shetty R, Nuijts R, Nicholson M, Sargod K, Jayadev C, Veluri H, **Sinha Roy A**. Cone location dependent outcomes after combined topography-guided photorefractive keratectomy and collagen crosslinking. *American Journal of Ophthalmology*. 2015; 159(3): 419-25.

34. Dabir S, Mangalesh S, Kumar KA, Kummelil MK, **Sinha Roy A**, Shetty R. Variations in the cone packing density with eccentricity in emmetropes. *Eye*. 2014; 28(12): 1488-93.

35. Shetty R, Ghosh A, Lim RR, Subramani M, Mihir K, Reshma AR, Ranganath A, Nagaraj S, Nuijts RMMA, Bueurman R, Das D, Chaurasia SS, **Sinha Roy A**, Ghosh A. Elevated expression of Matrix Metalloproteinase 9 and Inflammatory Cytokines in Keratoconus Patients is inhibited by Cyclosporine A. *Investigative Ophthalmology and Visual Science*. 2015; 56(2): 738-50.

36. Shetty R, Sathyanarayanamoorthy A, Ramachandra RA, Arora V, Ghosh A, Srivatsa P, Pahuja N, Nuijts RMMA, **Sinha Roy A**, Ghosh A. Attenuation of lysyl oxidase and collagen gene expression in keratoconus patient corneal epithelium corresponds to disease severity. *Molecular Vision*. 2015; 21: 12-25.

37. Shetty R, Kawer L, Pahuja N, Deshpande K, Thakkar M, **Sinha Roy A**. Association between corneal deformation and ease of lenticule separation from residual stroma in small incision lenticule extraction. *Cornea*. 2015; 34: 1067-71.

38. **Sinha Roy A**, Kurian M, Matalia H, Shetty R. Air-puff associated quantification of non-linear biomechanical properties of the human cornea *in vivo*. *Journal of Mechanical Behavior of Biomedical Materials*. 2015; 48: 173-82.

39. Shetty R, Matalia H, Srivatsa P, Ghosh A, Dupps WJ Jr, **Sinha Roy A**. A novel Zernike application to differentiate between three-dimensional corneal thickness of normal corneas and corneas with keratoconus. *American Journal of Ophthalmology*. 2015; 160: 453-462.

40. Shetty R, Nuijts RM, Srivatsa P, Jayadev C, Pahuja N, Akkali MC, **Sinha Roy A**. Understanding the Correlation between Tomographic and Biomechanical Severity of Keratoconic Corneas. *Biomedical Research International*. 2015:294197.

41. Beene L, Traboulsi E, Seven I, Ford M, **Sinha Roy A**, Butler R, Dupps WJ Jr. Corneal deformation response and ocular geometry: a non-invasive diagnostic strategy in Marfan syndrome. *American Journal of Ophthalmology*. 2016; 161: 56-64.

42. Tejwani S, Dinakaran S, Joshi A, Shetty R, **Sinha Roy A**. A cross-sectional study to compare intraocular pressure measurement by sequential use of Goldman applanation tonometry, dynamic contour tonometry, ocular response analyzer, and Corvis ST. *Indian Journal of Ophthalmology*. 2015; 63(11): 815-20.

43. Gadde SG, Anegondi N, Bhanushali D, Chidambara L, Yadav NK, Khurana A, **Sinha Roy A**. Quantification of Vessel Density in Retinal Optical Coherence Tomography Angiography Images Using Local Fractal Dimension. *Investigative Ophthalmology and Vision Science*. 2016; 57(1): 246-52.

44. Tejwani S, Devi S, Dinakaran S, Shetty R, Meshram P, Francis M, **Sinha Roy A**. Diagnostic Efficacy of Normalization of Corneal Deformation Variables by the Intraocular Pressure in Glaucomatous Eyes. *Investigative Ophthalmology and Vision Science*. 2016; 57(3): 1082-1086.

45. Shetty R, Shroff R, Kaweri L, Jayadev C, Kummelil MK, **Sinha Roy A**. Intra-Operative Cap Repositioning in Small Incision Lenticule Extraction (SMILE) for Enhanced Visual Recovery. *Current Eye Research*. 2016; 1-7.

46. Pahuja N, Kumar NR, Francis M, Shanbagh S, Shetty R, Ghosh A, **Sinha Roy A**. Correlation of Clinical and Biomechanical Outcomes of Accelerated Crosslinking (9 mW/cm^2 in 10 minutes) in Keratoconus with Molecular Expression of Ectasia-Related Genes. *Current Eye Research*. 2016; 1-5.

47. Bhanushali D, Anegondi N, Gadde SGK, Srinivasan P, Chidamabara L, Yadav NK, **Sinha Roy A**. Special Issue on OCT: Linking retinal microvasculature features with severity of diabetic retinopathy using Optical Coherence tomography angiography. *Investigative Ophthalmology and Vision Science.* 2016; 57(9): OCT519-25.

48. Matalia J, Francis M, Tejwani S, Dudeja G, Rajappa N, **Sinha Roy A**. Role of Age and Myopia in Simultaneous Assessment of Corneal and Extraocular Tissue Stiffness by Air-Puff Applanation. *Journal of Refractive Surgery*. 2016; 32(7): 486-93.

49. Pahuja N, Shroff R, Pahanpate P, Francis M, Veeboy L, Shetty R, Nuijts RM, **Sinha Roy A**. Application of high resolution OCT to evaluate irregularity of Bowman's layer in asymmetric keratoconus. *Journal of Biophotonics*. 2016; 10(5):701-707.

50. Pahuja NK, Shetty R, **Sinha Roy A**, Thakkar MM, Jayadev C, Nuijts RM, Nagaraja H. Laser Vision Correction with Q Factor Modification for Keratoconus Management. *Current Eye Research*. 2016 Oct 21:1-7.

51. Matalia H, Francis M, Gangil T, Chandapura R, Kurian M, Shetty R, Nelson E, **Sinha Roy A**. Non-contact quantification of topography of anterior corneal surface and Bowman's layer with high speed OCT. *Journal of Refractive Surgery*. 2017; 33(5): 330-336.

52. Shetty R, Pahuja N, Roshan T, Deshmukh R, Francis M, Ghosh A, **Sinha Roy A**. Customized corneal crosslinking using different UVA beam profiles. *Journal of Refractive Surgery*. 2017; 33(10):676-682.

53. Matalia J, Francis M, Gogri P, Panmand P, Matalia H, **Sinha Roy A**. Correlation of corneal biomechanical stiffness with refractive error and ocular biometry in pediatric population. *Cornea*. 2017; 36(10):1221-1226.

54. Francis M, Pahuja N, Shroff R, Gowda R, Matalia H, Shetty R, Nelson EJR, **Sinha Roy A**. Waveform analyses of deformation amplitude and deflection amplitude in normal, suspect and keratoconus eyes. *Journal of Cataract and Refractive Surgery*. 2017; 43(10):1271-1280.

55. Shetty R, Kochar S, Grover T, Khamar P, Kusumgar P, Sainani K, **Sinha Roy A**. Repeatability of a Commercially Available Adaptive Optics Visual Simulator and Aberrometer in Normal and Keratoconic Eyes. *Journal of Refractive Surgery*. 2017; 33(11): 769-772.

56. Shetty R, Francis M, Shroff R, Pahuja N, Khamar P, Girrish M, Nuijts RMMA, **Sinha Roy A**. Corneal Biomechanical Changes and Tissue Remodeling After SMILE and LASIK. *Investigative Ophthalmology and Vision Science*. 2017; 58(13): 5703-5712.

57. Chandapura RS, Shetty R, Shroff R, Shily N, Francis M, **Sinha Roy A**. OCT layered tomography of the cornea provides new insights on remodeling after photorefractive keratectomy. *Journal of Biophotonics*. 2018; 11(2).

58. Anegondi N, Chidambara L, Bhanushali D, Gadde S, Yadav NK, **Sinha Roy A**. An automated framework to quantify areas of regional ischemia in retinal vascular diseases with OCT angiography. *Journal of Biophotonics*. 2018; 11(2).

59. Shetty R, Vunnava KP, Khamar P, Choudhary U, **Sinha Roy A**. Topoguided Removal of corneal Epithelium for Keratoconus (TREK): a novel and customized technique. *Cornea*. 2018; 37(7): 923-925.

60. Shetty R, Rajiv Kumar N, Pahuja N, Deshmukh R, Vunnava K, Abilash VG, **Sinha Roy A**, Ghosh A. Outcomes of Corneal Cross-Linking Correlate with Cone-Specific Lysyl Oxidase Expression in Patients With Keratoconus. *Cornea*. 2018; 37(3): 369-374.

61. Anegondi N, Kshirsagar A, Mochi TB, **Sinha Roy A**. Quantitative Comparison of Retinal Vascular Features in Optical Coherence Tomography Angiography Images from Three Different Devices. *Ophthalmic Surg Lasers Imaging Retina*. 2018; 49(7): 488-496.

62. Shetty R, Matalia H, Nandini C, Shetty A, Khamar P, Grover T, **Sinha Roy A**. Wavefront-Guided LASIK has Comparable Ocular and Corneal Aberrometric Outcomes but Better Visual Acuity Outcomes than SMILE in Myopic Eyes. *J Refract Surg*. 2018; 34(8): 527-532.

63. Matalia J, Vinekar A, Anegondi N, Mangalesh S, Anaspure H, Shetty KB, **Sinha Roy A**. A Prospective OCT Study of Rubella Retinopathy. *Ophthalmol Retina*. 2018;2(12):1235-1240.

64. Govindaswamy N, Gadde SG, Chidambara L, Bhanushali D, Anegondi N, **Sinha Roy A**. Quantitative evaluation of OCT angiography images of diabetic retinopathy eyes before and after removal of projection artifacts. *J Biophotonics*. 2018; 11: e201800003.

65. Mahendradas P, Francis M, Vala R, Gowda PB, Kawali A, Shetty R, **Sinha Roy A**. Quantification of Ocular Biomechanics in Ocular Manifestations of Systemic Autoimmune Diseases. *Ocul Immunol Inflamm*. 2018; 1-11.

66. Khamar P, Dalal R, Chandapura R, Francis M, Shetty R, Nelson EJR, Nuijts RMMA, **Sinha Roy A**. Corneal tomographic features of post-refractive surgery ectasia. *J Biophotonics*. 2019; 12: e201800253.

67. Shetty N, Kochar S, Paritekar P, Artal P, Shetty R, Nuijts RMMA, Webers CAB, **Sinha Roy A**. Patient-specific determination of change in ocular spherical aberration to improve near and intermediate visual acuity of presbyopic eyes. *J Biophotonics*. 2019: 12(4):e201800259.

68. Francis M, Khamar P, Shetty R, Sainani K, Nuijts RMMA, Haex B, **Sinha Roy A**. In Vivo Prediction of Air-Puff Induced Corneal Deformation Using LASIK, SMILE, and PRK Finite Element Simulations. *Invest Ophthalmol Vis Sci*. 2018; 59(13): 5320-5328.

69. Shetty R, Kumar NR, Khamar P, Francis M, Sethu S, Randleman JB, Krueger RR, **Sinha Roy A**, Ghosh A. Bilaterally Asymmetric Corneal Ectasia Following SMILE with Asymmetrically Reduced Stromal Molecular Markers. *J Refract Surg*. 2019; 35(1): 6-14.

70. Khamar P, Shetty R, Vaishnav R, Francis M, Nuijts RMMA, **Sinha Roy A**. Biomechanics of LASIK Flap and SMILE Cap: A Prospective, Clinical Study. *J Refract Surg*. 2019;35(5):324-332.

71. Mahendradas P, Madhu S, Kawali A, **Sinha Roy A**, Vala R, Vinekar A, Shetty R. Enhanced Vitreous Imaging in Uveitis. *Ocul Immunol Inflamm*. 2019;27(1):148-154.

72. Chandapura R, Salomão MQ, Ambrósio R Jr, Swarup R, Shetty R, **Sinha Roy A**. Bowman's topography for improved detection of early ectasia. *J Biophotonics*. 2019: e201900126.

73. Tejwani S, Francis M, Dinakaran S, Kamath V, Tilva B, Das RK, Shetty R, **Sinha Roy A**. Influence of Anterior Biometry on Corneal Biomechanical Stiffness of Glaucomatous Eyes Treated with Chronic Medication or Filtration Surgery. *J Glaucoma*. 2019;28(7):626-632.

74. Shetty N, Dadachanji Z, Narasimhan R, Kundu G, Khamar P, Ahuja P, Kumar V, Kumar V, Shetty R, Nuijts RMMA, **Sinha Roy A**. Status of Residual Refractive Error, Ocular Aberrations, and Accommodation After Myopic LASIK, SMILE, and TransPRK. *J Refract Surg*. 2019; 35(10):624-631.

75. Francis M, Matalia H, Nuijts RMMA, Haex B, Shetty R, **Sinha Roy A**. Corneal Viscous Properties Cannot Be Determined from Air-Puff Applanation. *J Refract Surg*. 2019;35(11):730-736.

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