Ian A Sigal

List of Publications by Year
in descending order

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95 papers	5,993 citations	172386 29 h-index	168321 53 g-index
99 all docs	99 docs citations	99 times ranked	2690 citing authors

#	Article	IF	Citations
1	Factors Influencing Optic Nerve Head Biomechanics. , 2005, 46, 4189.		453
2	Finite Element Modeling of Optic Nerve Head Biomechanics. , 2004, 45, 4378.		286
3	Biomechanics of the optic nerve head. Experimental Eye Research, 2009, 88, 799-807.	1.2	283
4	Longitudinal Change Detected by Spectral Domain Optical Coherence Tomography in the Optic Nerve Head and Peripapillary Retina in Experimental Glaucoma. , 2011, 52, 1206.		201
5	Glaucomatous cupping of the lamina cribrosa: A review of the evidence for active progressive remodeling as a mechanism. Experimental Eye Research, 2011, 93, 133-140.	1.2	199
6	Dimensions of the human sclera: Thickness measurement and regional changes with axial length. Experimental Eye Research, 2010, 90, 277-284.	1.2	179
7	Finite element modeling of the human sclera: Influence on optic nerve head biomechanics and connections with glaucoma. Experimental Eye Research, 2011, 93, 4-12.	1.2	163
8	Predicted extension, compression and shearing of optic nerve head tissues. Experimental Eye Research, 2007, 85, 312-322.	1.2	159
9	Posterior (Outward) Migration of the Lamina Cribrosa and Early Cupping in Monkey Experimental Glaucoma. , 2011, 52, 7109.		159
10	Scleral structure and biomechanics. Progress in Retinal and Eye Research, 2020, 74, 100773.	7.3	153
11	Modeling individual-specific human optic nerve head biomechanics. Part I: IOP-induced deformations and influence of geometry. Biomechanics and Modeling in Mechanobiology, 2009, 8, 85-98.	1.4	148
12	IOP-Induced Lamina Cribrosa Displacement and Scleral Canal Expansion: An Analysis of Factor Interactions Using Parameterized Eye-Specific Models. , 2011, 52, 1896.		147
13	Modeling individual-specific human optic nerve head biomechanics. Part II: influence of material properties. Biomechanics and Modeling in Mechanobiology, 2009, 8, 99-109.	1.4	142
14	Correlation between Local Stress and Strain and Lamina Cribrosa Connective Tissue Volume Fraction in Normal Monkey Eyes. , 2010, 51, 295.		123
15	Eye-Specific IOP-Induced Displacements and Deformations of Human Lamina Cribrosa. , 2014, 55, 1.		121
16	Deformation of the Early Glaucomatous Monkey Optic Nerve Head Connective Tissue after Acute IOP Elevation in 3-D Histomorphometric Reconstructions. , 2011, 52, 345.		119
17	Effect of Acute Intraocular Pressure Elevation on the Monkey Optic Nerve Head as Detected by Spectral Domain Optical Coherence Tomography. , 2011, 52, 9431.		118
18	Deformation of the Normal Monkey Optic Nerve Head Connective Tissue after Acute IOP Elevation within 3-D Histomorphometric Reconstructions. , 2009, 50, 5785.		115

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19	IOP-Induced Lamina Cribrosa Deformation and Scleral Canal Expansion: Independent or Related?. , 2011, 52, 9023.		114
20	Lamina cribrosa thickening in early glaucoma predicted by a microstructure motivated growth and remodeling approach. Mechanics of Materials, 2012, 44, 99-109.	1.7	97
21	Changes in the Biomechanical Response of the Optic Nerve Head in Early Experimental Glaucoma. , 2010, 51, 5675.		93
22	Translating Ocular Biomechanics into Clinical Practice: Current State and Future Prospects. Current Eye Research, 2015, 40, 1-18.	0.7	92
23	Interactions between Geometry and Mechanical Properties on the Optic Nerve Head. , 2009, 50, 2785.		91
24	3D morphometry of the human optic nerve head. Experimental Eye Research, 2010, 90, 70-80.	1.2	87
25	In Vivo Lamina Cribrosa Micro-Architecture in Healthy and Glaucomatous Eyes as Assessed by Optical Coherence Tomography. , 2013, 54, 8270.		86
26	Polarization microscopy for characterizing fiber orientation of ocular tissues. Biomedical Optics Express, 2015, 6, 4705.	1.5	82
27	Mesh-morphing algorithms for specimen-specific finite element modeling. Journal of Biomechanics, 2008, 41, 1381-1389.	0.9	78
28	Collagen Architecture of the Posterior Pole: High-Resolution Wide Field of View Visualization and Analysis Using Polarized Light Microscopy. , 2017, 58, 735.		74
29	Reconstruction of human optic nerve heads for finite element modeling. Technology and Health Care, 2005, 13, 313-329.	0.5	69
30	Recent advances in OCT imaging of the lamina cribrosa. British Journal of Ophthalmology, 2014, 98, ii34-ii39.	2.1	69
31	3D visualization of aqueous humor outflow structures in-situ in humans. Experimental Eye Research, 2011, 93, 308-315.	1.2	67
32	Cerebrospinal Fluid Pressure: Revisiting Factors Influencing Optic Nerve Head Biomechanics. , 2018, 59, 154.		61
33	In Vivo Three-Dimensional Characterization of the Healthy Human Lamina Cribrosa With Adaptive Optics Spectral-Domain Optical Coherence Tomography. , 2014, 55, 6459.		56
34	Spatial Patterns and Age-Related Changes of the Collagen Crimp in the Human Cornea and Sclera. , 2018, 59, 2987.		53
35	Automated lamina cribrosa microstructural segmentation in optical coherence tomography scans of healthy and glaucomatous eyes. Biomedical Optics Express, 2013, 4, 2596.	1.5	52
36	Magic Angleâ€"Enhanced MRI of Fibrous Microstructures in Sclera and Cornea With and Without Intraocular Pressure Loading. , 2014, 55, 5662.		51

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37	Effects of collagen microstructure and material properties on the deformation of the neural tissues of the lamina cribrosa. Acta Biomaterialia, 2017, 58, 278-290.	4.1	50
38	Collagen fiber recruitment: A microstructural basis for the nonlinear response of the posterior pole of the eye to increases in intraocular pressure. Acta Biomaterialia, 2018, 72, 295-305.	4.1	49
39	Radial and Circumferential Collagen Fibers Are a Feature of the Peripapillary Sclera of Human, Monkey, Pig, Cow, Goat, and Sheep. , 2018, 59, 4763.		49
40	Polarized light microscopy for 3â€dimensional mapping of collagen fiber architecture in ocular tissues. Journal of Biophotonics, 2018, 11, e201700356.	1.1	46
41	Experimental Glaucoma Causes Optic Nerve Head Neural Rim Tissue Compression: A Potentially Important Mechanism of Axon Injury. , 2016, 57, 4403.		45
42	Regionally Discrete Aqueous Humor Outflow Quantification Using Fluorescein Canalograms. PLoS ONE, 2016, 11, e0151754.	1.1	44
43	Crimp around the globe; patterns of collagen crimp across the corneoscleral shell. Experimental Eye Research, 2018, 172, 159-170.	1.2	44
44	In-vivo effects of intraocular and intracranial pressures on the lamina cribrosa microstructure. PLoS ONE, 2017, 12, e0188302.	1.1	44
45	Morphing methods to parameterize specimen-specific finite element model geometries. Journal of Biomechanics, 2010, 43, 254-262.	0.9	43
46	Lamina Cribrosa Pore Shape and Size as Predictors of Neural Tissue Mechanical Insult. , 2017, 58, 5336.		40
47	Repeatability of in vivo 3D lamina cribrosa microarchitecture using adaptive optics spectral domain optical coherence tomography. Biomedical Optics Express, 2014, 5, 1114.	1.5	39
48	Reconstruction of human optic nerve heads for finite element modeling. Technology and Health Care, 2005, 13, 313-29.	0.5	39
49	Formalin Fixation and Cryosectioning Cause Only Minimal Changes in Shape or Size of Ocular Tissues. Scientific Reports, 2017, 7, 12065.	1.6	36
50	Collagen fiber interweaving is central to sclera stiffness. Acta Biomaterialia, 2020, 113, 429-437.	4.1	36
51	Non-invasive MRI Assessments of Tissue Microstructures and Macromolecules in the Eye upon Biomechanical or Biochemical Modulation. Scientific Reports, 2016, 6, 32080.	1.6	34
52	Connective tissue remodeling in myopia and its potential role in increasing risk of glaucoma. Current Opinion in Biomedical Engineering, 2020, 15, 40-50.	1.8	32
53	Characterisation of Schlemm's canal cross-sectional area. British Journal of Ophthalmology, 2014, 98, ii10-ii14.	2.1	31
54	The Optic Nerve Head as a Robust Biomechanical System. , 2012, 53, 2658.		28

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55	A Few Good Responses: Which Mechanical Effects of IOP on the ONH to Study?. , 2012, 53, 4270.		28
56	Gold Nanorods as a Contrast Agent for Doppler Optical Coherence Tomography. PLoS ONE, 2014, 9, e90690.	1.1	27
57	In Vivo Evaluation of White Matter Integrity and Anterograde Transport in Visual System After Excitotoxic Retinal Injury With Multimodal MRI and OCT. , 2015, 56, 3788.		27
58	Microstructural Crimp of the Lamina Cribrosa and Peripapillary Sclera Collagen Fibers. , 2017, 58, 3378-3388.		27
59	Whole-globe biomechanics using high-field MRI. Experimental Eye Research, 2017, 160, 85-95.	1.2	26
60	Gaze-Evoked Deformations in Optic Nerve Head Drusen. Ophthalmology, 2018, 125, 929-937.	2.5	26
61	Reproducibility of In-Vivo OCT Measured Three-Dimensional Human Lamina Cribrosa Microarchitecture. PLoS ONE, 2014, 9, e95526.	1.1	24
62	Peripapillary sclera architecture revisited: A tangential fiber model and its biomechanical implications. Acta Biomaterialia, 2018, 79, 113-122.	4.1	24
63	A mesh-free approach to incorporate complex anisotropic and heterogeneous material properties into eye-specific finite element models. Computer Methods in Applied Mechanics and Engineering, 2020, 358, 112654.	3.4	24
64	Human Lamina Cribrosa Insertion and Age. , 2012, 53, 6870.		22
65	An Applet to Estimate the IOP-Induced Stress and Strain within the Optic Nerve Head. , 2011, 52, 5497.		21
66	Parameters for Lithium Treatment Are Critical in Its Enhancement of Fracture-Healing in Rodents. Journal of Bone and Joint Surgery - Series A, 2014, 96, 1990-1998.	1.4	21
67	Use and Misuse of Laplace's Law in Ophthalmology. , 2016, 57, 236.		21
68	Tortuous Pore Path Through the Glaucomatous Lamina Cribrosa. Scientific Reports, 2018, 8, 7281.	1.6	20
69	Structured polarized light microscopy for collagen fiber structure and orientation quantification in thick ocular tissues. Journal of Biomedical Optics, 2018, 23, 1.	1.4	20
70	A Problem of Proportions in OCT-Based Morphometry and a Proposed Solution. , 2016, 57, 484.		19
71	Thin Lamina Cribrosa Beams Have Different Collagen Microstructure Than Thick Beams. , 2018, 59, 4653.		17
72	Role of radially aligned scleral collagen fibers in optic nerve head biomechanics. Experimental Eye Research, 2020, 199, 108188.	1.2	16

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73	Instant polarized light microscopy for imaging collagen microarchitecture and dynamics. Journal of Biophotonics, 2021, 14, e202000326.	1.1	16
74	Mesh Morphing and Response Surface Analysis: Quantifying Sensitivity of Vertebral Mechanical Behavior. Annals of Biomedical Engineering, 2010, 38, 41-56.	1.3	15
75	A geometric morphometric assessment of the optic cup in glaucoma. Experimental Eye Research, 2010, 91, 405-414.	1.2	15
76	So-Called Lamina Cribrosa Defects May Mitigate IOP-Induced Neural Tissue Insult. , 2020, 61, 15.		14
77	Histogram Matching Extends Acceptable Signal Strength Range on Optical Coherence Tomography Images. , 2015, 56, 3810.		13
78	What is a typical optic nerve head?. Experimental Eye Research, 2016, 149, 40-47.	1.2	13
79	Interplay between intraocular and intracranial pressure effects on the optic nerve head in vivo. Experimental Eye Research, 2021, 213, 108809.	1.2	13
80	Real-time imaging of optic nerve head collagen microstructure and biomechanics using instant polarized light microscopy. Experimental Eye Research, 2022, 217, 108967.	1.2	13
81	Thick Prelaminar Tissue Decreases Lamina Cribrosa Visibility. , 2017, 58, 1751.		12
82	Lamina Cribrosa Capillaries Straighten as Intraocular Pressure Increases. , 2020, 61, 2.		12
83	A high-accuracy and high-efficiency digital volume correlation method to characterize in-vivo optic nerve head biomechanics from optical coherence tomography. Acta Biomaterialia, 2022, 143, 72-86.	4.1	12
84	Location of the Central Retinal Vessel Trunk in the Laminar and Prelaminar Tissue of Healthy and Glaucomatous Eyes. Scientific Reports, 2017, 7, 9930.	1.6	11
85	Decreased Lamina Cribrosa Beam Thickness and Pore Diameter Relative to Distance From the Central Retinal Vessel Trunk. , 2016, 57, 3088.		10
86	Identifying the Palisades of Vogt in Human ExÂVivo Tissue. Ocular Surface, 2016, 14, 435-439.	2.2	7
87	Seeing the Hidden Lamina: Effects of Exsanguination on the Optic Nerve Head. , 2018, 59, 2564.		7
88	Measuring in-vivo and in-situ ex-vivo the 3D deformation of the lamina cribrosa microstructure under elevated intraocular pressure. , 2018, , .		7
89	Lamina cribrosa vessel and collagen beam networks are distinct. Experimental Eye Research, 2022, 215, 108916.	1.2	7
90	An imaged-based inverse finite element method to determine mechanical properties of the human trabecular meshwork. Journal for Modeling in Ophthalmology, 2017, 1, 100-111.	0.1	6

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91	A Mesh-Free Approach to Incorporate Complex Anisotropic and Heterogeneous Material Properties into Eye-Specific Finite Element Models. Computer Methods in Applied Mechanics and Engineering, 2020, 358, .	3.4	5
92	MAPS â€“ A Magic Angle Positioning System for Enhanced Imaging in High-Field Small-Bore MRI. Journal of Medical Robotics Research, 2016, 01, 1640004.	1.0	2
93	Instant polarized light microscopy for real-time wide-field visualization of collagen architecture. , 2020, , .		2
94	Eye-specific 3D modeling of factors influencing oxygen concentration in the lamina cribrosa. Experimental Eye Research, 2022, 220, 109105.	1.2	1
95	A Workflow for 3D Reconstruction and Quantification of the Monkey Optic Nerve Head Vascular Network. Journal of Biomechanical Engineering, 2022, , .	0.6	0