







Publication List







Sylvain Gigan

All publications are provided with a hyperlink () and are accessible through Google Scholar  or via my ORCID profile : 0000-0002-9914-6231. A selection of key publications is highlighted.

Review Articles

- (3) **Inference in artificial intelligence with deep optics and photonics**
G. Wetzstein, A. Ozcan, S. Gigan, S. Fan, D. Englund, M. Soljačić, C. Denz, D. A. B. Miller, D. Psaltis
Nature, 588, 39 (2020) 
- (2) **Light fields in complex media: mesoscopic scattering meets wave control**
S. Rotter, S. Gigan
Rev. Mod. Phys. 89, 015005 (2017) 
- (1) **Photoacoustics with coherent light**
E. Bossy and S. Gigan
Photoacoustics, doi:10.1016/j.pacs.2016.01.003 (2016) 



Preprints
















- (5) **Label-free super-resolution chemical imaging of biomedical specimens**
J. Guilbert, A. Negash, S. Labouesse, S. Gigan, A. Sentenac, H. B de Aguiar
BiorXiv, DOI : 10.1101/2021.05.14.444185 
- (5) **Roadmap on multimode light shaping**
M. Piccardo, V. Ginis, A. Forbes, S. Mahler, A. A. Friesem, N. Davidson, H. Ren, A. H. Dorrah, F. Capasso, F. T. Dullo, B. S. Ahluwalia, A. Ambrosio, S. Gigan, N. Treps, M. Hiekkamäki, R. Fickler, M. Kues, D. Moss, R. Morandotti, J. Riemensberger, T. J. Kippenberg, J. Faist, G. Scalari, N. Picqué, T. W. Hänsch, G. Cerullo, C. Manzoni, L. A. Lugiato, M. Brambilla, L. Columbo, A. Gatti, F. Prati, A. Shiri, A. F. Abouraddy, A. Alù, E. Galiffi, J.B. Pendry, P. A. Huidobro
arXiv:2104.03550 [physics.optics] 
- (4) **Deeply Sub-Wavelength Localization with Reverberation-Coded-Aperture**
M. Del Hougne, S. Gigan, P. Del Hougne
arXiv:2102.05642 [physics.app-ph] 
- (3) **Speckle engineering through singular value decomposition of the transmission matrix**
L. Devaud, B. Rauer, J. Melchard, M. Kühmayer, S. Rotter, S. Gigan
arXiv:2010.06868 [physics.optics] 
- (2) **Light-in-the-loop: using a photonics co-processor for scalable training of neural networks**
J. Launay, I. Poli, K. Müller, I. Carron, L. Daudet, F. Krzakala, S. Gigan
arXiv:2006.01475 [physics.optics] 
- (1) **Wavefront Shaping of the Pump in Multimode Fiber Amplifiers; The Gain-Dependent Transmission Matrix**
T. Sperber, V. Billault, P. Sebbah, S. Gigan
arXiv:1911.07812 [physics.optics] 















Research papers

- 2021 (95) **Three-dimensional broadband light beam manipulation in forward scattering samples**
P. Arjmand, O. Katz, S. Gigan, M. Guillon
Opt. Express 29, 6563-6581 (2021) 


- (94) **Visualization of Directional Beaming of Weakly Localized Raman from a Random Network of Silicon Nanowires**
M. J. Lo Faro, G. Ruello, A. A. Leonardi, D. Morganti, A. Irrera, F. Priolo, S. Gigan, G. Volpe, B. Fazio
Advanced Science, 2100139 (2021)
- (93) **Mean path length invariance in wave-scattering beyond the diffusive regime**
M. Davy, M. Kühmayer, S. Gigan, S. Rotter
Commun Phys 4, 85 (2021)
- (92) **Scalable spin-glass optical simulator**
D. Pierangeli, M. Rafayelyan, C. Conti, S. Gigan
Phys. Rev. Applied 15, 034087 (2021)
- (91) **Spectrally-resolved point-spread-function engineering using a complex medium**
A. Boniface, M. Mounaix, B. Blochet, H. B. de Aguiar, F. Quéré, S. Gigan
Opt. Express 29, 8985-8996 (2021)
- (90) **Accelerating ptychographic reconstructions using spectral initializations**
L. Valzania, J. Dong, S. Gigan
Optics Letters 46, 1357 (2021)
- 2020 (89) **Large-Scale Optical Reservoir Computing for Spatiotemporal Chaotic Systems Prediction**
M. Rafayelyan, J. Dong, Y. Tan, F. Krzakala, S. Gigan
Phys. Rev. X 10, 041037 (2020)
- (88) **Hardware Beyond Backpropagation: a Photonic Co-Processor for Direct Feedback Alignment**
J. Launay, I. Poli, K. Müller, G. Pariente, I. Carron, L. Daudet, F. Krzakala, S. Gigan
NeurIPS, Beyond Backpropagation Workshop (2020)
- (87) **Non-invasive focusing and imaging in scattering media with a fluorescence-based transmission matrix**
A. Boniface, J. Dong, S. Gigan
Nature Communications 11: 6154 (2020)
- (86) **Non-invasive single-shot recovery of point-spread function of a memory effect based scattering imaging system**
T. Wu, J. Dong, S. Gigan
Optics Letters, Opt. Lett. 45, 5397 (2020)
- (85) **Chromato-axial memory effect through a forward-scattering slab**
L. Zhu, J. Boutet de Monvel, P. Berto, S. Brasselet, S. Gigan, and M. Guillon
Optica 7, 338 (2020)
- (84) **Readout of fluorescence functional signals through highly scattering tissue**
C. Moretti, S. Gigan
Nature Photonics 14, 361 (2020)
 - o G. Weitzstein and Isaac Kauvar, News and Views “Optically sensing neural activity without imaging” Nature Photonics 14, 340 (2020)
 - o cover pick “Speckle analysis beats scatter” Nature Photonics, issue 14 June (2020)
 - o Bel Dumé “Matrix factorization algorithms help track neuronal activity” Physics World (2020)
- (83) **Far-field Wavefront Control of Nonlinear Luminescence in Disordered Gold Metasurfaces**
G. Roubaud, P. Bondareff, G. Volpe, S. Gigan, S. Bidault, S. Gresillon
NanoLetters 20, 5, 3291 (2020)
- (82) **Local Optimization of Wavefronts for high sensitivity PHase Imaging (LowPhi)**
T. Juffmann, A. de los Ríos Sommer, S. Gigan
Optics Communications, 124484 (2020)
- (81) **Optical Reservoir Computing using multiple light scattering for chaotic systems prediction**
J. Dong, M. Rafayelyan, F. Krzakala, S. Gigan
IEEE Journal of Selected Topics in Quantum Electronics, 10.1109/JSTQE.2019.2936281 (2020)















- (80) **Programmable linear quantum networks with a multimode fibre**
S. Leedumrongwatthanakun, L. Innocenti, H. Defienne, T. Juffmann, A. Ferraro, M. Paternostro, S. Gigan
Nature Photonics 14, 139 (2020) 
 ◦ Research Highlight, N. Meinzer "Mix and Match" Nat. Phys. 16, 4 (2020) (2020) 
- 2019** (79) **Enhanced stability of the focus obtained by wavefront optimization in dynamical scattering media**
B. Blochet, K. Joaquina, L. Blum, L. Bourdieu, S. Gigan
Optica 6, 1554-1561 (2019) 
- (78) **Non-invasive light focusing in scattering media using speckle variance optimization**
A. Boniface, B. Blochet, J. Dong, S. Gigan
Optica 6, 1381-1385 (2019) 
- (77) **Spectral Method for Multiplexed Phase Retrieval and Application in Optical Imaging in Complex Media**
J. Dong, F. Krzakala, S. Gigan
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 10.1109/ICASSP.2019.8682329 (2019) 
- (76) **Invariance properties of bacterial random walks in complex structures**
G. Frangipane, G. Vizsnyiczai, C. Maggi, R. Savo, A. Sciortino, S. Gigan, R. Di Leonardo
Nature Communications 10, 2442 (2019) 
 ◦ "Obstacle Course", research Highlight, Nature Physics 15,622 (2019) 
- (75) **Spatially-entangled Photon-pairs Generation Using Partial Spatially Coherent Pump Beam**
H. Defienne, S. Gigan
Phys. Rev. A 99, 053831(2019) 
- (74) **High-sensitivity high-speed compressive spectrometer for Raman imaging**
B. Sturm, F. Soldevila, E. Tajahuerce, S. Gigan, H. Rigneault, H. B. de Aguiar
ACS Photonics 6, 1409 (2019) 
- (73) **Fast compressive Raman bio-imaging via matrix completion**
F. Soldevila, J. Dong, E. Tajahuerce, S. Gigan, H. B. De Aguiar
Optica, 6, 3, 341 (2019) 
- (72) **Rapid broadband characterization of scattering medium using hyperspectral imaging**
A. Boniface, I. Gusachenko, K. Dholakia, S. Gigan
Optica 6, 274 (2019) 
- (71) **Controlling light in complex media beyond the acoustic diffraction-limit using the acousto-optic transmission matrix**
O.Katz, F. Ramaz, S. Gigan, M. Fink
Nature Communications, 10:717 (2019) 
- 2018** (70) **Snapshot fiber spectral imaging using speckle correlations and compressive sensing**
R. French, S. Gigan, O. Muskens
Optics Express 26, 32302 (2018) 
- (69) **Transmission matrix approaches for non-linear fluorescence excitation through multiple scattering media** M. Mounaix, D. M. Ta, S. Gigan
Optics Letters 43, 2831 (2018) 
- (68) **Scaling up Echo-State Networks with multiple light scattering**
J. Dong, S. Gigan, F. Krzakala, G. Wainrib
IEEE Statistical Signal Processing Workshop (SSP), 448 (2018) 
- 2017** (67) **Focusing light through dynamical samples using fast closed-loop wavefront optimization**
B. Blochet, L. Bourdieu, S. Gigan
Opt. Lett. 42, 4994 (2017) 

- (66) **Observation of mean path length invariance in light-scattering media**
R. Savo, R. Pierrat, U. Najar, R. Carminati, S. Rotter, S. Gigan
Science 358, 765 (2017) 
- (65) **Imaging through a thin scattering layer and jointly retrieving the point-spread-function using phase-diversity**
T. Wu, J. Dong, X. Shao, S. Gigan
Optics Express 25, 27182 (2017) 
- (64) **Temporal recompression through a scattering medium via a broadband transmission matrix**
M. Mounaix, H. B. de Aguiar, S. Gigan
Optica 4, 1289 (2017) 
- (63) **Polarization recovery through scattering media**
H.B. de Aguiar, S. Gigan, S. Brasselet
Science Advances, Vol. 3, no. 9, e1600743 (2017) 
- (62) **Speckle-based hyperspectral imaging combining multiple scattering and compressive sensing in nanowire mats**
R. French, S. Gigan, O. Muskens
Optics Letters 42, 1820 (2017) 
- (61) **Photoacoustic imaging beyond the acoustic diffraction-limit with dynamic speckle illumination and sparse joint support recovery**
E. Hojman, T. Chaigne, O. Solomon, S. Gigan, E. Bossy, Y. C. Eldar, O. Katz
Optics Express 25(5), 4875 (2017) 
- (60) **Transmission-matrix-based point-spread-function engineering through a complex medium**
A. Boniface, M. Mounaix, B. Blochet, R. Piestun, S. Gigan
Optica 4, 54 (2017) 
- (59) **Robust Phase Retrieval with the Swept Approximate Message Passing (prSAMP) Algorithm**
B. Rajaei, S. Gigan, F. Krzakala, and L Daudet
Image Processing On Line, 7 , pp. 43–55 (2017) 
- 2016 (58) **Single-shot diffraction-limited imaging through scattering layers via bispectrum analysis**
T. Wu, O. Katz, X. Shao, S. Gigan
Optics Letters 41(21), 5003 (2016) 
- (57) **Enhanced nonlinear imaging through scattering media using transmission matrix based wavefront shaping**
H.B. de Aguiar, S. Gigan, S. Brasselet
Phys. Rev. A 94, 043830 (2016)  (editor's suggestion)
- (56) **Deterministic light focusing in space and time through multiple scattering media with a Time-Resolved Transmission Matrix approach**
M. Mounaix, H. Defienne, S. Gigan
Phys. Rev. A 94, 041802 (2016)  (rapid communication)
- (55) **Fast phase retrieval for high dimensions: A block-based approach**
B. Rajaei, S. Gigan, F. Krzakala, L. Daudet
IEEE Signal Processing Letters 23,1179 (2016) 
- (54) **Widefield lensless imaging through a fiber bundle via speckle correlations**
A. Porat, E. Ravn Andresen, H. Rigneault, D. Oron, S. Gigan, O. Katz
Optics Express 24, 16835 (2016) 
- (53) **Spatiotemporal coherent control of light through a multiply scattering medium with the Multi-Spectral Transmission Matrix**
M. Mounaix, D. Andreoli, H. Defienne, G.Volpe, O. Katz, S. Grésillon, and S. Gigan
Phys. Rev. Lett. 116, 253901 (2016) 
- (52) **Disorder-mediated crowd control in an active matter system**
E. Pince, S.K.P. Velu, A. Callegari, S.Gigan, G.Volpe, G.Volpe
Nature Communications 7:10907 (2016) 

- (51) **Two-photon quantum walk in a multimode fiber**
H. Defienne, M. Barbieri, I. A. Walmsley, B. J. Smith, S. Gigan
Science Advances, Vol. 2, no. 1, e1501054 (2016) 
- (50) **Super-resolution photoacoustic fluctuation imaging with multiple speckle illumination**
T. Chaigne, J. Gateau, M. Allain, O. Katz, S. Gigan, A. Sentenac, E. Bossy
Optica 3, 54 (2016) 
- (49) **Intensity-only optical compressive imaging using a multiply scattering material: a double phase retrieval problem**
B.Rajaei, E. Tramel, S. Gigan, F. Krzakala, L.Daudet
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) Shanghai (2016)  x
- (48) **Random projections through multiple optical scattering: approximating kernels at the speed of light**
A.Saade, F. Caltagirone, I. Carron, L. Daudet, A. Drémeau, S. Gigan, F. Krzakala
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) Shanghai (2016) 
- 2015** (47) **Probing extended modes on disordered plasmonic networks by wavefront shaping**
P. Bondareff, G. Volpe, S. Gigan, S. Grésillon
ACS Photonics 2, 1658 (2015) 
- (46) **Characterization of the angular memory effect of scattered light in biological tissues**
S.Schott, J.Bertolotti, J.F. Léger, L. Bourdieu, S. Gigan
Optics Express 23,13505 (2015) 
- (45) **Deterministic control of broadband light through a multiply scattering medium via the multispectral transmission matrix**
D. Andreoli, G. Volpe, S. Popoff, O. Katz, S. Grésillon, Gigan
Scientific Reports 5, 10347 (2015) 
- (44) **Reference-less measurement of the transmission matrix of a highly scattering material using a DMD and phase retrieval techniques**
A. Dreameau, A. Liutkus, D. Martina, O. Katz, C. Schulke, F. Krzakala, S. Gigan, L. Daudet
Optics Express 23, 11898 (2015) 
- (43) **Step-by-step Guide to the Realisation of Advanced Optical Tweezers**
G. Pesce, G. Volpe, O.M. Marago, P.H. Jones, S. Gigan, A. Sasso, G. Volpe
Journal of the Optical Society of America B, (32) 5, B84 (2015) 
- (42) **Scanning-free imaging through a single fiber by random spatio-spectral encoding**
S. M. Maliszewska, O. Katz, M. Fink, S. Gigan
Optics Letters 40, 534 (2015) 
- 2014** (41) **Invariance property of wave scattering through disordered media**
R. Pierrat, P. Ambichl, S. Gigan, A. Haber, R. Carminati, S. Rotter
Proc. of the National Academy of Science of the USA, 111 (50) 17765 (2014) 
- (40) **Simulation of the active Brownian motion of a microswimmer**
G. Volpe, S. Gigan, G. Volpe
American Journal of Physics 82, 659 (2014) 
- (39) **Nonclassical light manipulation in a multiple-scattering medium**
H. Defienne, M. Barbieri, B. Chalopin, B. Chatel, I. Walmsley, B. Smith, S. Gigan
Optics Letters 39, 6090 (2014) 
- (38) **Improving Photoacoustic-guided Focusing in Scattering Media by Spectrally Filtered Detection**
T. Chaigne, O. Katz, J. Gateau, C. Boccara, S. Gigan, E. Bossy
Optics Letters, 39, 6054 (2014) 

- (37) **Non-invasive real-time imaging through scattering layers and around corners via speckle correlations**
 O.Katz, P.Heidmann, M.Fink, S. Gigan
 Nature Photonics, 8, 794 (2014) 
 o Nature News Features "Optics: Super Vision" Z. Merali, Nature 518, 158 (2015) 
 o News and views "Peeking through the curtain" J. Bertolotti, Nat. Phot., 8, 751 (2014) 
 o Interview "Deciphering Speckle" M. Maragkou, Nature Photonics, 8, 808 (2014) 
- (36) **Speckle Optical Tweezers: Micromanipulation with Random Light Fields**
 G. Volpe, L. Kurz, A. Callegari, G. Volpe, S. Gigan
 Optics Express, 22, 18159 (2014) 
- (35) **Imaging With Nature: Compressive Imaging Using a Multiply Scattering Medium**
 A. Liutkus, D. Martina, S. Popoff, G. Chardon, O. Katz, G. Lerosey, S. Gigan, L. Daudet, I. Carron
 Scientific Reports 4, 5552 (2014) 
- (34) **Adaptive pumping for spectral control of random lasers**
 N. Bachelard, S. Gigan, X. Noblin, P. Sebbah
 Nature Physics 10, 426 (2014) 
 o News and views "Random lasers:Playing pinball with light" S. Rotter, Nat.Phys. 10, 412 (2014) 
 o Cover Pick "The random laser tamed" Nat. Physics, issue 10, June (2014) 
- (33) **Light focusing and two-dimensional imaging through scattering media using the photoacoustic transmission matrix with an ultrasound array**
 T. Chaigne, J. Gateau, O. Katz, E. Bossy, S. Gigan
 Optics Letters 39, 2664 (2014) 
- (32) **Brownian Motion in a Speckle Light Field: Tunable Anomalous Diffusion and Selective Optical Manipulation**
 G. Volpe, G. Volpe, S. Gigan
 Scientific Reports, 4 : 3936 (2014) 
- (31) **Controlling light in scattering media noninvasively using the photo-acoustic transmission-matrix**
 T. Chaigne, O. Katz, A.C. Boccara, M. Fink, E. Bossy, S. Gigan
 Nature Photonics 8, 58 (2014) 
- (30) **Compressed Sensing Under Strong Noise. Application to Imaging Through Multiply Scattering Media**
 A. Liutkus, D. Martina, S. Gigan and L. Daudet
 Proceedings of the 22th European Signal Processing Conf. (EUSIPCO'2014), Lisbon (2014) 
- 2013 (29) **Improving visibility in photoacoustic imaging using dynamic speckle illumination**
 J. Gateau, T. Chaigne, O. Katz, S. Gigan, E. Bossy
 Optics Letters 38, 5188 (2013) 
- (28) **Phase-space behavior and conditional dynamics of an optomechanical system**
 S. Groeblacher, S. Gigan, M. Paternostro
 Phys. Rev. A 88, 023813 (2013) 
- (27) **A 4000 Hz CMOS Image Sensor with In-Pixel Processing for Light Measurement and Modulation**
 T. Laforest, A. Dupret and A. Verdant, F. Ramaz, S. Gigan, G. Tessier and E. Benoit à la Guillaume
 IEEE 11th International NEWCAS Conference (2013) 
- (26) **Utilisation d'un milieu optique diffusant pour la caractérisation de modulateurs spatiaux de lumière**
 A. Liutkus, D. Martina, O. Katz, L. Daudet and S. Gigan
 Proceedings of GRESTI'13, Brest (2013)

- 2012** (25) **Measuring aberrations in the rat brain by coherence-gated wavefront sensing using a Linnik interferometer**
J. Wang, J.F Leger, J. Binding, A.C. Boccara, S. Gigan, and L. Bourdieu
Biomedical Optics Express 3, 2510 (2012) 
- (24) **Taming Random Lasers through Active Spatial Control of the Pump**
N. Bachelard, J. Andreasen, S. Gigan, and P. Sebbah
Phys. Rev. Lett. 109, 033903 (2012) 
o Focus: How to Control a Random Laser, APS's Physics, 5,80 (2012) 
- (23) **Towards a Real Time Sensor for Focusing Through Scattering Media**
T. Laforest, A. Verdant, A. Dupret, S. Gigan and F. Ramaz,
Sensors IEEE (2012) 
- 2011** (22) **Exploiting the Time-Reversal Operator for Adaptive Optics, Selective Focusing, and Scattering Pattern Analysis**
S. M. Popoff, A. Aubry, G. Lerosey, M. Fink, A. C. Boccara, and S. Gigan
Phys. Rev. Lett. 107, 263901 (2011) 
- (21) **Controlling Light Through Optical Disordered Media : Transmissiom Matrix Approach**
S. M. Popoff, G. Lerosey, M. Fink, A. C. Boccara, S. Gigan
New J. Phys. 13 123021 (2011) 
- (20) **Single myelin fiber imaging in living rodents without labeling by deep optical coherence microscopy**
J. Ben Arous, J. Binding, J.F. Léger, M. Casado, S. Gigan, A.C. Boccara, L. Bourdieu
Journal of Biomedical Optics 16 (11), 116012 (2011) 
- (19) **Direct Determination of Diffusion Properties of Random Media from Speckle Contrast**
N. Curry, P. Bondareff, M. Leclercq, N. F. van Hulst, R. Sapienza, S. Gigan, S. Gresillon
Optics Letters 36, 3332 (2011) 
- (18) **Spatio-temporal focussing of an ultrafast pulse through a multiply scattering medium**
D.J. McCabe, A. Tajalli, D.R. Austin, P. Bondareff, I.A. Walmsley, S. Gigan, B. Chatel
Nature Communications 2:447 (2011) 
- (17) **In vivo rat brain refractive index measurement using full-field OCT and consequences for two photon microscopy**
J. Binding, J. Ben Arous, J.F. Léger, S. Gigan, A.C. Boccara, L. Bourdieu
Optics Express 19, 4833 (2011) 
- 2010** (16) **Image Transmission Through an Opaque Material**
S. Popoff, G. Lerosey, M. Fink, A.C. Boccara, S. Gigan
Nature Communications 1:81 (2010) 
o Nature Research Highlight 467, 503 (2010) "Optics: Through a Glass darkly"
- (15) **Measuring the Transmission Matrix in Optics: An Approach to the Study and Control of Light Propagation in Disordered Media**
S. Popoff, G. Lerosey, R. Carminati, M. Fink, A.C. Boccara, S. Gigan
Phys. Rev. Lett. 104, 100601 (2010) 
o E. G. van Putten and A. P. Mosk, The information age in optics: Measuring the transmission matrix, Physics, 3, 22 (2010) 
o Complex media: Transmission matrix clout, research highlights, Nature photonics, 4, 264 (2010) 
- 2009** (14) **Defocus test and defocus correction in full-field optical coherence tomography**
S. Labiau, G. David, S. Gigan, A.C. Boccara
Optics Letters 34, 1576 (2009) 
- (13) **Demonstration of an ultracold micro-optomechanical oscillator in a cryogenic cavity**
S. Groeblacher, J. B. Hertzberg, M. R. Vanner, S. Gigan, K. C. Schwab, M. Aspelmeyer
Nature Physics, 5, 485 (2009) 



- 2008** (12) **Monocrystalline AlGaAs heterostructures for high-reflectivity high-Q micromechanical resonators in the MHz regime**
G. D. Cole, S. Groeblacher, K. Gugler, S. Gigan, M. Aspelmeyer
Appl. Phys. Lett. 92, 261108 (2008) 
- (11) **Ground-state cooling of a micromechanical oscillator: Comparing cold damping and cavity-assisted cooling schemes**
C. Genes, D. Vitali, P. Tombesi, S. Gigan, M. Aspelmeyer
Phys. Rev. A 77, 033804 (2008) 
- (10) **Radiation pressure self-cooling of a micromirror in a cryogenic environment**
S. Groeblacher, S. Gigan, H. R. Böhm, A. Zeilinger, M. Aspelmeyer
Eur. Phys. Lett. 81, 54003 (2008) 
- 2007** (9) **Creating and probing multipartite macroscopic entanglement with light**
M. Paternostro, D. Vitali, S. Gigan, M. S. Kim, C. Brukner, J. Eisert, M. Aspelmeyer
Phys. Rev. Lett. 99, 250401 (2007) 
- (8) **Optomechanical entanglement between a movable mirror and a cavity field**
D. Vitali, S. Gigan, A. Ferreira, H. R. Böhm, P. Tombesi, A. Guerreiro, V. Vedral, A. Zeilinger, M. Aspelmeyer
Phys. Rev. Lett. 98, 030405 (2007) 
- 2006** (7) **Self-cooling of a micro-mirror by radiation pressure**
S. Gigan, H. R. Böhm, M. Paternostro, F. Blaser, G. Langer, J.B. Hertzberg, K. C. Schwab, D. Bäuerle, M. Aspelmeyer, A. Zeilinger
Nature 444, 67 (2006) 
 - Nature News and Views, Khaled Karrai; *ibid.* page 42 
 - Nature Milestone (2006) Cavity Optomechanics 
 - "Highlight of the recent literature", Science, Jan 2007
- (6) **High reflectivity high-Q micromechanical Bragg mirror**
H. Böhm, S. Gigan, G. Langer, J. Hertzberg, F. Blaser, D. Bäuerle, K.C. Schwab, A. Zeilinger, M. Aspelmeyer
Appl. Phys. Lett. 89, 223101 (2006) 
- (5) **Reconstructing the dynamics of a movable mirror in a detuned optical cavity**
M. Paternostro, S. Gigan, M S Kim, F Blaser, H R Böhm and M Aspelmeyer
New Journal of Physics 6, 107 (2006) 
- (4) **Continuous-wave phase-sensitive parametric image amplification**
S. Gigan, L. Lopez, V. Delaubert, N. Treps, A. Maître and C. Fabre
Journal of Modern Optics 53, 5, 809 (2006) 
- 2005** (3) **Image transmission through a stable paraxial cavity**
S. Gigan, L. Lopez, N. Treps, A. Maître and C. Fabre
Phys. Rev. A 72, 023804 (2005) 
- (2) **Multimode squeezing properties of a confocal optical parametric oscillator: Beyond the thin-crystal approximation**
A. Gatti, L. Lopez, S. Gigan, A. Maître, C. Fabre
Phys. Rev. A 72, 013806 (2005) 
- 2003** (1) **Spatial distribution of quantum intensity correlations in a confocal Type II Optical Parametric Oscillators**
M. Martinelli, N. Treps, S. Ducci, S. Gigan, A. Maître, C. Fabre
Phys. Rev. A 67, 023808 (2003) 

Patents & Patent applications





- (9) **Device for imaging the electromagnetic field of a sample**
S. Gigan, G. Tessier, Y. De Wilde, L. Greusard, K. Bencheikh
FR1650165 (2015) WO 2017/118828 / US2019/04185A1


- (8) **Multiple scattering medium for compressive imaging**
S.Gigan, S. Popoff, G. Lerosey, I. Carron, L. Daudet, G. Chardon
Patent WO 2013068783 (2013) US Patent 20,150,036,021 (2015)
- (7) **Device for measuring and controlling the wave-front of a coherent light beam patent**
T. Laforest, A. Dupret, A. Verdant, S. Gigan, F. Ramaz, G. Tessier
FR 2998964, WO2014087099 (2013) US 20150325973 (2015)
- (6) **Methods and Device for Trapping, Moving and Sorting Particles Contained in a Fluid**
S. Gigan, G. Volpe, G. Volpe
WO20141067155 (2014) US 20150338324 (2015)
- (5) **Digital-data mixing apparatus and digital data processing system**
S.Gigan, F. Krzakala, L. Daudet, Laurent, I. Carron, A. Drémeau, A. Saade
European Patent EP15305165
 - o Licenced to LightOn S.A.
- (4) **Systems and methods for high resolution imaging using a bundle of optical fiber**
E. R. Andresen, S. Gigan, O. Katz, D. Oron, A. Porat, H. Rigneault
European patent office N1000326718, PCT application number PCT/FR2015/053594
- (3) **High sensitivity phase microscopy imaging**
S. Gigan, A. De Los Rios Sommer, T. Juffman
EP 18306171 (2018)
- (2) **Imaging Of The Ocular Fundus With Speckle Illumination**
S. Gigan, K. Irsh, R. Piestun, M. Labouesse
U.S. Provisional Patent Application No. 62/908,151
- (1) **Concepts Pertaining To Integrated Sensor And Optical Phase/Amplitude Modulator**
C. Yang, S. Gigan
PCT/US2018/03908

Book Chapters

- (2) **Using the Transmission Matrix to Image Disordered Media**
M. Davy, S. Gigan, and A.Z. Genack
Page 489-516. Shi L, Alfano RR (eds). Deep Imaging in Tissue and Biomedical Materials Using Linear and Nonlinear Optical Methods, Pan Stanford Publishing Pte Ltd, Singapore (2017) 
- (1) **Transmission Matrix Approach to Light Control in Complex Media**
S. Gigan
Page 121-155. Kubby, Gigan, Cui (editors). Wavefront shaping for biomedical imaging, Cambridge University Press (2017) 

News and Views

- (5) **Folding photography in the time domain** News and Views
S. Gigan
Nature Photonics 12 (9), 502 (2018) 
 - o On : Heshmat, Barmak, et al. "Photography optics in the time dimension." Nature Photonics 12.9 (2018): 560.
- (4) **Optical microscopy aims deep** « Feature » for the 10 years of Nature Photonics
S. Gigan
Nature Photonics 11, 14–16 (2017) 
- (3) S. Gigan, **Spotlight in Optics** (OSA) (2013) 
 - o Elizabeth Bemand and Haida Liang, Optical coherence tomography for vulnerability assessment of sandstone, Applied Optics, Vol. 52 Issue 14, pp.3387-3393 (2013)
- (2) S. Gigan, **Spotlight in Optics** (OSA) (2012)  :
 - o Auksorius et al. « Dual-modality fluorescence and full-field optical coherence microscopy for biomedical imaging applications » Biomedical Optics Express, Vol. 3, Issue 3, pp. 661-666 (2012)

- (1) **Viewpoint : Endoscopy slims down**
S. Gigan
Physics 5, 127 (2012)  :
o Y. Choi et al., « Scanner-Free and Wide-Field Endoscopic Imaging by Using a Single Multimode Optical Fiber » Phys. Rev. Lett. 109, 203901 (2012)

General Audience Publications

- (8) **artificial intelligence: from electronics to optics**
S. Gigan, F. Krzakala, L. Daudet, I. Carron
Photoniques (2020) 
- (7) **How to organize an online conference** Comment
O. Reshef, I. Aharonovich, A. M. Armani, S. Gigan, R. Grange, M. A. Kats, R Sapienza
Nature Reviews Materials (2020) 
- (6) **Contrôle Spatiotemporel de la lumière en milieux complexes**
M. Mounaix, H. Defienne, S. Gigan
Dossier « technologies et dispositif de l'optique adaptative "
10.1051/photon/20189229, Photoniques (monthly magazine of the French Optical Society)(2018)

- (5) **La lumière pour diagnostiquer**
S. Gigan and V. Emiliani
La Lumière en Lumière, EDP Science editions, Editors : B. Boulanger, S. Guellati, D. Hennequin
M.S. Stehle (2016)
- (4) **A photoacoustic transmission matrix for deep optical imaging**
S. Gigan and E. Bossy
SPIE Newsroom, DOI: 10.1117/2.1201401.005312 (2014) 
- (3) **Contrôler la lumière à travers un milieu désordonné : approche matricielle et applications**
S. Popoff, G. Lerosey, S. Gigan
Techniques de l'ingénieur (2011)
- (2) **L'optique adaptative : un nouvel outil pour la microscopie en profondeur des tissus biologiques**
S. Gigan, A.C Boccara
Revue perspectives 2010 (Revue des élèves de l'institut d'optique)
- (1) **Voir à travers le brouillard**
S. Gigan
Numéro spécial « L'univers des ondes »
Pour la science (French edition of Scientific American), 409, (Nov. 2011) 