

# Dr OKSANA TRUSHKEVYCH

Assistant Professor  
School of Engineering, University of Warwick

## **Summary**

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PhD, Engineering, University of Cambridge, UK, October 2006

Gates Cambridge Scholarship (2001 – 2004), ORS Award (2001 – 2004)

Junior Research Fellow, Wolfson College, Cambridge, UK (2006 – 2010)

PGA in Interdisciplinary Teaching, University of Warwick (2019)

Associate Fellow, Warwick Institute of Engagement (from 2021)

2 patents, 1 patent application, 25 publications in peer reviewed journals, 15 publications in peer reviewed conference proceedings

339 citations, h-index 10, i10-index 12 (Google Scholar)

6 seminars/invited talks; 20 oral contributions, over 20 poster presentations at national and international conferences; organiser of 2 international conferences

## **Previous employment**

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**Senior Research Fellow** (Aug 2021 – Sept 2022) Ultrasonics Group, Physics Department, University of Warwick, UK.

**Senior Research Fellow**, (Nov 2020 – Jul 2021) School of Engineering, University of Warwick, UK

**Research/Senior Research Fellow, Co-Investigator** (May 2018 – Oct 2020) Ultrasonics Group, Physics Department, University of Warwick, UK. *Promoted to Senior Research Fellow 1 June 2019*

*RCNDE Core research Feasibility “Polymer dispersed liquid crystal sensors for high resolution NDE” (Jan-Sept 2019)*

*RCNDE Core research “Remote and Automated Delivery of Non-Contact NDE Sensors” 50% FTE*

**Research Fellow** (Oct 2017 – May 2018), Sonemat, Physics Department, University of Warwick, UK

*Thermography for additive manufacturing 80%FTE*

Maternity leave (May 2018 – Jan 2019)

**Research Fellow** (Apr 2016 – Sept 2017), Ultrasonics Group, Physics Department, University of Warwick, UK  
*Non-contact ultrasonic scanning miniaturised EMAT system (ERC proof of concept grant) ~80%FTE*

**Co-investigator** (Apr 2017 - Jul 2017) *Enhancing the sensitivity of liquid crystal ultrasound sensors (PI, Materials GRP pump-priming grant) 10%FTE*

**Research Fellow/Co-Investigator** (Sept 2014 – Jun 2015) Ultrasonics Group, Physics Department, University of Warwick, UK; *Liquid crystal sensors for high resolution monitoring of power components and structures; 40% FTE (PI, Materials GRP research award)*

Maternity leave (Jul 2015 – Mar 2016)

**Research Fellow** (Oct 2011 – Aug 2014) Ultrasonics Group, Physics Department, University of Warwick, UK  
*Ultrasonic measurements on single crystals of magnetic materials at low temperatures and in magnetic fields*

Maternity leave (Apr 2013 – Sept 2013)

**Research Associate** (Feb 2010 – Sep 2011) Nanomaterials Spectroscopy Group, Centre for Advanced Photonics and Electronics, Engineering Department, Cambridge University, UK  
*Carbon nanomaterials characterisation for photonic and electronic device applications*

**Visiting Research Fellow** (Nov 2009 – Jan 2010) Liquid Crystal Materials Research Center, Physics Department, University of Colorado at Boulder, USA  
*Photonics of fullerene doped chiral nematic liquid crystals*

**Research Associate** (May 2005 - Nov 2009), Photonics and Sensors Group, Centre for Advanced Photonics and Electronics, Engineering Department, Cambridge University, UK  
*Liquid crystals and nanomaterials for photonics and electronics*

### ***Fellowships***

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Jan 2021 **Associate Fellow**, Warwick Institute of Engagement, University of Warwick, UK

Nov 2009 - Jan 2010 **International Exchange Fellowship** from the International Institute for Advanced Complex Matter (I2CAM) for a research visit to Boulder, CO, USA

Oct 2006 - Sept 2010 **Junior Research Fellowship**, Wolfson College, Cambridge University, UK

### ***Teaching***

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2022 – currently Module leader on 3<sup>rd</sup> year undergraduate ES386 Dynamics of vibrating systems (lectures, laboratory)

2021-Jan 2023 Academic lead on 2<sup>nd</sup> year undergraduate laboratory “Microprocessors”; undergraduate tutoring; co-supervising PhD student.

2017 – currently Module Leader of the “Science of Music”, Institute of Advanced Teaching and Learning, University of Warwick; 2015 member of the team developing the module, 2016/2017 part of the teaching team

2011 – currently Supervising graduate and undergraduate research and summer research projects, University of Warwick

2010-2011 Teaching foundation course in Physics (Electrodynamics) to international students for Cambridge Ruskin International College (CRIC), Cambridge, UK

2009 - 2011 PhD Academic Advisor to a PhD student, Photonics and Sensors Group, University of Cambridge, UK

2002-2009 Laboratory demonstrations for Part IA Engineering Tripos; supervising 4th year project students; supervisor for Part IB Natural Sciences Tripos, *Oscillations and waves*; supervisor for Part IIB Engineering Tripos, *Radio frequency electronics*

2000 Teaching Physics to 11 – 16 year olds, High School#21, Lviv, Ukraine.

### ***Impact, outreach and engagement***

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Apr 2022 Leading an event at the Resonate festival as a part of Coventry city of culture year: “Resonate: a string, a concert hall, a universe”

Mar 2022 WIE Collaboration and Co-Production award, University of Warwick, UK

Sept 2019 British Science Festival, leading the “Immersed in Sound Waves” performance-based event. Interview by BBC Coventry and Warwickshire about the event and the science behind sound.

2011 – currently outreach events: judge at Ogden Trust Primary Science Fair, demonstrating during School visits and at Warwick University Open Days; assisting at University of Warwick Christmas lectures, lecture for WISE chapter at Eatone College, Nuneaton

2008 – 2011 Educational Policy Committee member, co-creator of mentoring scheme for PhD students; mentoring 3 Physics PhD students (2010-2011); Co-founder of the Wolfson College Science Society; co-organiser of an annual Science Day (cross-disciplinary student competition); co-organiser of Wolfson College Lunchtime seminars (informal cross-disciplinary series)

### ***Professional activities and responsibilities***

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Member of the British Liquid Crystal Society (BLCS) (2001 - currently); the Institute of Physics (IOP) (2011 – 2014), the Institute of Electrical and Electronics Engineers (IEEE) (2011-2013), the International Institute for Complex Adaptive Matter (I2CAM) – (2008 – 2011), the International Society for Optics and Photonics SPIE (2002 - 2007)

Reviewer for a number of academic journals including *J. Phys D*, *Phys. Rev E*, *Nanotechnology*, *2D Materials*, *NDT&E Int.*

RA Supervisor of the EPSRC Platform Grant for the Photonics and Sensors Group, University of Cambridge (2007-2009)

Interviewing panel member for postdoctoral competition in Photonics and Sensors group (2007), for Wolfson JRF competition (2008) and for Cambridge Gates Scholarship: physical sciences panel (2009)

Co-organiser of the 2<sup>nd</sup> International workshop "Liquid Crystals for Photonics" LCP2008 ~130 participants; Guest co-editor of a special issue for *Molecular Crystals Liquid Crystals Journal* dedicated to the LCP2008

Main organiser of the International Conference for Students and Young Scientists EURECA 2001 ~100 participants

### **Patents**

International patent application PCT/GB2007/001784, publication WO 2007/132230 A1 (US 60/800,532)

#### **Method of operating an OASLM and holographic display system**

International Patent Application PCT/GB2017/052869, publication number WO 2018/189498

#### **Packaged and enhanced EMAT Ultrasonic NDT System**

UK Patent Application PJP/AXB/119844GB1, application No 2112813.7, filing date 8.09.2021

#### **Liquid crystal based films for acoustic field visualisation**

### **Publications in primary journals (citations included for the highest ranking papers)**

O **Trushkevych**, S Dixon, M Tabatabaeipour, MDG Potter, C MacLeod, Gordon Dobie, RS Edwards, "Calibration-free SH guided wave analysis for screening of wall thickness in steel with varying properties", *NDT & E International*, 102789 (2023)

M Tabatabaeipour, O **Trushkevych**, G Dobie, RS Edwards, R McMillan, C Macleod, R O'Leary, S Dixon, A Gachagan, S G. Pierce, Application of ultrasonic guided waves to robotic occupancy grid mapping, *Mechanical Systems and Signal Processing*, 163, (2022)

O. **Trushkevych**, R.S. Edwards, "Differential coil EMAT for simultaneous detection of in-plane and out-of-plane components of surface acoustic waves", *IEEE Sensors Journal*, 20 (19), 11156-11162 (2020)

LQ Zhou, G Colston, M Myronov, DR Leadley, O **Trushkevych**, V Shah, R.S. Edwards, "Ultrasonic inspection and self-healing of Ge and 3C-SiC semiconductor membranes", *Journal of Microelectromechanical Systems* 29 (3), 370-377 (2020)

O. **Trushkevych**, M. Tabatabaeipour, S. Dixon, M.D.G. Potter, G. Dobie, C. Macleod and R.S. Edwards, "Miniaturised SH EMATs for fast robotic screening of wall thinning in steel plates", *IEEE Sensors Journal* 21 (2), 1386-1394 (2020)

R.S. Edwards, J. Ward, L. Zhou and O. **Trushkevych**, "The interaction of polymer dispersed liquid crystal sensors with ultrasound", *Applied Physics Letters*, 116, 5, 2020-02-03 (2020)

O. **Trushkevych**, and R.S. Edwards, "Characterisation of small defects using miniaturised EMAT system", *NDT & E International*, 107, 102140 (2019) **19 citations**

LQ Zhou, G Colston, MJ Pearce, RG Prince, M Myronov, DR Leadley, O **Trushkevych**, and RS Edwards, "Non-linear vibrational response of Ge and SiC membranes", *Applied Physics Letters*, 111, 011904 (2017)

O. **Trushkevych**, T.J.R. Eriksson, S.N. Ramadas, S. Dixon and R.S. Edwards, "Acousto-optics with polymer dispersed liquid crystals for ultrasound sensing", *Applied Physics Letters* 107, 054102 2015

O. **Trushkevych**, V.A. Shah, M. Myronov, J.E. Halpin, S.D. Rhead, M.J. Prest, D.R. Leadley and R.S. Edwards, "Laser-vibrometric ultrasonic characterization of resonant modes and quality factors of Ge membranes", *Science and Technology of Advanced Materials*, 15, 2, 025004 (2014)

V.A. Shah, S.D. Rhead, J.E. Halpin, O. **Trushkevych**, E. Chávez-Ángel, A. Shchepetov, V. Kachkanov, N.R. Wilson, M. Myronov, J.S. Reparaz, R.S. Edwards, M.R. Wagner, F. Alzina, I.P. Dolbnya, D.H. Patchett, P.S. Allred, M.J. Prest, P.M. Gammon, M. Prunnila, T.E. Whall, E.H.C. Parker, C.M. Sotomayor Torres, D.R.

Leadley, "High quality single crystal Ge nano-membranes for opto-electronic integrated circuitry", Journal of Applied Physics, 115, 14, 144307 (2014)

O. **Trushkevych**, Y. Fan, R. Perry and R.S. Edwards, "Magnetic phase transitions in Gd<sub>64</sub>Sc<sub>36</sub> measured using non-contact ultrasonics", Journal of Physics D: Applied Physics, 46, 105005 (2013)

S. Vasi, M. A. Monaca, M. G. Donato, F. Bonaccorso, G. Privitera, O. **Trushkevych**, G. Calogero, B. Fazio, A. Irrera, M. A. Iati, R. Saija, P. Denti, F. Borghese, P. H. Jones, A. C. Ferrari, P. G. Gucciardi, and O. M. Marago; "Optical Trapping of Carbon Nanotubes and Graphene" AAPP, 89, 1, C1V89S1P090 (2011)

O. **Trushkevych**, P. Ackerman, W.A. Crossland, I.I. Smalyukh "Optically Generated Adaptive Localized Structures in Confined Chiral Liquid Crystals Doped with Fullerene", Applied Physics Letters, 97, 201906 (2010) **29 citations**

O. **Trushkevych**, H. Xu, T. Lu, J.A. Zeitler, R. Rungsawang, F. Gölden, N. Collings and W.A. Crossland, "Broad spectrum measurement of the birefringence of an isothiocyanate based liquid crystal", Applied Optics 49, 28, 5212 -5216 (2010) **20 citations**

O. **Trushkevych**, F. Gölden, M. Pivnenko, H. Xu, N. Collings, W.A. Crossland, S. Müller and R. Jakoby "Dielectric anisotropy of nematic liquid crystals loaded with carbon nanotubes in a microwave range", Electronics Letters, 46, 10, 693 - 695 (2010), highlight article in the issue. **18 citations**

O. **Trushkevych**, N. Collings, T. Hasan, V. Scardaci, A.C. Ferrari, T.D. Wilkinson, W.A. Crossland, W.I. Milne, J. Geng, B.F.G. Johnson, and S. Macaulay, "Characterisation of carbon nanotube - thermotropic nematic liquid crystal composite materials", Journal of Physics D: Applied Physics, 41, 125106 (2008) **61 citations**

O. **Trushkevych**, N. Collings, W.A. Crossland, T.D. Wilkinson, W.I. Milne, "Dynamics in dye-doped LC systems in presence of Trans-Cis isomerism", Molecular Crystals and Liquid Crystals, 478, 1, pp. 221/[977] - 232/[988] (2008)

O. **Trushkevych**, N. Collings, W.A. Crossland, T.D. Wilkinson, "Projection of holograms from photorefractive OASLMs", J. Nonlinear Opt. Physics & Materials, 16, 3, pp. 307-316 (2007)

O. **Trushkevych**, N. Collings, W.A. Crossland, T.D. Wilkinson, "Resolution in optically addressed spatial light modulators based on dye-doped liquid crystals", Applied Optics 45, 35, pp. 8889-8892 (2006)

O. **Trushkevych**, N. Collings, W.A. Crossland, T.D. Wilkinson, "Optical nonlinearity in azo-anthraquinone doped liquid crystals", J. Nonlinear Opt. Physics & Materials, 15, 2, pp. 265-274 (2006)

O. **Trushkevych**, N. Collings, W.A. Crossland, T.D. Wilkinson, A.B. Davey "Optical studies on dye-doped liquid crystal systems", Molecular Crystals Liquid Crystals, 434, pp. 63/[391] - 77/[405] (2005),

*Note that my name was Ruzak previously:*

O. **Ruzak**, N. Collings, W.A. Crossland, T.D. Wilkinson, A.B. Davey I.C. Khoo "Dynamic holographic gratings in Methyl Red – doped nematic liquid crystals", J. Nonlinear Opt. Physics & Materials, 12, 4, pp. 441-446 (2003)

I. Polovynko, O. **Ruzak**, S. Sveleba, I. Katerynychuk, O. Semotiuk, O. Fitsych. "Automatisation of temperature measurements of increment of optical birefringence, using Senarmont's method", Visnyk of Lviv University, Physics Series, 35. pp. 48-53 (2002)

It is a convention in Ukraine that the research supervisor is the lead author on student's papers.

#### **Contributions to symposia and compiled volumes (refereed only)**

M. Tabatabaeipour, O. **Trushkevych**, G. Dobie, R.S. Edwards, C. Macleod, S.G. Pierce, " Guided Wave Based-Occupancy Grid Robotic Mapping", European Workshop on Structural Health Monitoring, 267-275 (2021)

O. **Trushkevych**, S. Dixon, M. Tabatabaeipour, G. Dobie, M.D.G. Potter, G. Dobie, C. Macleod, A. Gachagan, G. Pierce and R.S. Edwards, "Towards Guided Wave Robotic NDT Inspection: EMAT Size Matters," 2019 IEEE International Ultrasonics Symposium (IUS), pp. 104-107 (2019)

## Dr Oksana Trushkevych CV

M. Tabatabaeipour, O. **Trushkevych**, G. Dobie, R.S. Edwards, S. Dixon, C. MacLeod, A. Gachagan, S. G. Pierce "A Feasibility Study on Guided Wave- Based Robotic Mapping," *2019 IEEE International Ultrasonics Symposium (IUS)*, 2019, pp. 1567-1570 (2019)

Leiqing Q. Zhou, Gerard Colston, Oksana **Trushkevych**, Maksym Myronov, David R. Leadley, and Rachel S. Edwards, "Quality-factor and frequency shifts of suspended Ge membranes", *Proceedings of Meetings on Acoustics*, Vol. 32, 032003 (5 pages) (2018)

Edwards, R.S., Zhou, L.Q., Pearce, M.J., Prince, R.G., Colston, G., Myronov, M., Leadley, D.R., **Trushkevych**, O., "Laser ultrasonic characterization of membranes for use as micro-electronic mechanical systems (MEMS)", *AIP Conference Proceedings*, 1806, 050013 (6 pages) (2017)

Edwards, R.S., **Trushkevych**, O., Eriksson, T.J.R., Ramadas, S.N., Dixon, S., "Ultrasound visualization using polymer dispersed liquid crystal sensors", *AIP Conference Proceedings*, 1806, 020021 (5 pages) (2017)

V. A. Shah, O. **Trushkevych**, M. Myronov, S. Rhead, J. Halpin, R. Edwards, D. R. Leadley., "Tensile strained Ge membranes," *2014 15th International Conference on Ultimate Integration on Silicon (ULIS)*, Stockholm, 2014, pp. 137-140 (2014)

T. Hasan, Z. Sun, D. Popa, E. J. R. Kelleher, F. Bonaccorso, E. Flahaut, F. Torrisi, O. **Trushkevych**, G. Privitera, V. Nicolosi, J. R. Taylor, and A. C. Ferrari, "Broadband ultrafast pulse generation with Double Wall Carbon Nanotubes," in *CLEO/Europe and EQEC 2011 Conference Digest*, OSA Technical Digest (CD), paper JSII2\_4 (1page), Optical Society of America, (2011)

H. Xu, O. **Trushkevych**, N. Collings, W.A. Crossland, "Measurement of dielectric anisotropy of some liquid crystals for microwave applications", *Molecular Crystals and Liquid Crystals*, 502, 235 – 244 (2009)

The journal is the major journal for LC related research, but the issue is dedicated to a conference, hence I have listed it under conference proceedings.

N. Collings, O. **Trushkevych**; W. A. Crossland ; T. D. Wilkinson; "Single layer liquid crystal optically addressed spatial light modulators", *Proc. SPIE 6332, Liquid Crystals X*, 633205 (6 pages) (2006)

O. **Ruzak**, N. Collings, W.A. Crossland, T.D. Wilkinson, A.B. Davey "Stable dopant for liquid crystals as materials for optically addressed spatial light modulators.", *Proc. SPIE Int. Soc. Opt. Eng.* 5518, pp.104-114 (2004)

O. **Ruzak**, N. Collings, W.A. Crossland "Dye-doped Liquid Crystals as materials for optically addressed spatial light modulators", *Postgraduate Research Program conference proceedings* (2003)

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