

OSMAN AKIN

Florianstraße 15-21 Dortmund 44139 Germany

E-mail: osman.akin@optogonstudio.com

Phone: +90-505-525 1023

Key skills: Optical Design, Optical Metrology, Optical Measurement Techniques – Free Space and Waveguides, Optical Characterisation. TracePro, LightTools, Zemax

Experienced in: Laser and LED Optics, Waveguides and Light Guides, Illumination, Imaging Optics, Diffractive Optics, Fiber-Based Sensing Systems, and Sensors.

EDUCATION

PhD in Optics

IZMIR INSTITUTE OF TECHNOLOGY, IZMIR, TURKEY

Electrical and Electronics Engineering

(January 2013)

Dissertation: Realization of All-Optical Switching and Routing Devices Exploiting Third Order Optical Nonlinear Properties.

MSc in Photonics

IZMIR INSTITUTE OF TECHNOLOGY, IZMIR, TURKEY

Electrical and Electronics Engineering

(February 2005)

Thesis: All-Optical Switching Via Diffraction Gratings Obtained By Interference Of Two Gaussian Beams

Bachelor of Science

EGE UNIVERSITY, IZMIR / TURKEY

Electrical & Electronics Engineering

(September 2001)

ACADEMIC TRAINING

Short Term Scientific Research Trainee

MAX BORN INSTITUTE

BERLIN, GERMANY

Nonlinear nanostructures for ultrafast laser applications

(May 2011)

Microtechnology Research Trainee

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE (EPFL)

Neuchâtel – SWITZERLAND / Besançon-FRANCE

(June/July 2006)

Vibration Measurements by Laser Techniques

THE UNIVERSITA POLITECNICA DELLE MARCHE

Ancona/Italy

(June 2004)

WORK EXPERIENCE

OptogonStudio

Design and Manufacturing Services

Dortmund/Germany & Izmir/Turkey

(2020 – Present)

- Development of optical systems from scratch into the production stage
- Validation of the developed system in the laboratory – TRL2 to TRL8
- Manufacturing of custom polymeric optical components – PMMA & Polycarbonate Lenses
- Development of spectroscopic sensors based on fluorescence and absorption
- Development and realization of point and distributed optical (fibre or free space) sensing systems

IZMIR KATIP CELEBI UNIVERSITY**IZMIR, TURKEY****Lecturer**

(2016 – present)

- Optical System Design
- Optical Sensors
- Design of Display Systems

IZMIR INSTITUTE OF TECHNOLOGY**IZMIR, TURKEY****Research Assistant / Researcher**

(2002 – 2016)

- Realization of an inline node for add/drop multiplexer capable of fast all-optical switching in a fibre.
- Modelling and investigating non-periodic structure in the fibre cladding (evanescent region) for potential sensing application
- Optical POC Devices

INOVASENS**TEKNOPARKIZMIR, IZMIR, TURKEY****Co-Founder**

(2016 - 2020)

- Development of Portable Photomicrograph for DNA Sequencing
Responsible for the development of illumination unit and colour detection structure
- Wearable Respiration Monitoring Device
Developing an instrumentation unit to measure the resistance change in paper layered carbon nanotube structures

FISENS**TEKNOPARKIZMIR, IZMIR, TURKEY****Co-Founder**

(2014 - 2020)

Optical Sensor Systems for Smart Cities: Fibre-Based Monitoring Systems

VESTEL DIGITAL**IZMIR, TURKEY****Research&Deveopment, Contractor**
(2006-2007)

- Modelling and developing LCD backlight modules using LightTools.
- Brightness Enhancement Film and Diffuser Characterization and the implementation of laboratory measurements into the LightTools.

CABOT**IZMIR, TURKEY****Research&Development, Contractor**

(2005-2006)

- *Hand-Held Camera Front End Development*
Responsible for developing and integrating the optical elements (lens and image sensor) into the handheld camera system.

INDUSTRIAL PROJECTS under Contract Agreements

1. **Development and realization of a test structure for measuring the optical displacements (Angular Deviations and Lateral Displacement) of ballistic resistant transparencies for heavy class attack helicopters, Tusas, Turkey, 2020-2021.**
 - Preparation of test methodology according to the ASTM F801-16 standard.

- Setup the optical bench and implementation of the test procedure
 - Error Analysis
2. **Optical Scanning Unit for Printers (Collimator + F theta Scanning Lens System), Burelsan, Turkey**
 - Zemax OpticStudio was used to design an F-theta scanning lens. A galvanometer-based approach was developed where the entrance beam size was 10 mm and the focused beam diameter was 80 μ m.
 - RGB laser diodes were utilized as light sources and the lasers were collimated to obtain a non-divergent circular beam at the reflecting surface of the galvanometer. TracePro was utilized to design the optical system.
 3. **Optical Design of the LCoS Pico-Projector, The Aird, USA, 2020**
 - LCoS-based pico projector was developed in the project. RGB laser diodes together with off-the-shelf lenses were exploited in the device realization. TracePro was used as a modelling tool for developing the optical system.
 4. **Utilization of Nanopatterns in Microdisplays, Opticon, Greece, 2021**
 - LED backlight unit incorporating nano-patterns was developed to improve the system's field of view and depth of view parameters. LightTools was used to model the realistic backlight unit with side emitted LEDs and a light-guide plate.
 5. **Light Guide Design for Automotive Indoor Lighting - Sigma International Lighting LLC, USA, 2020**
 - Cup Holder Light Guide Design was performed using TracePro
 6. **Optical Fluorescence Spectrometer Design for BG Research Limited, UK, 2021**
 - Four different spectrometer designs for Covid and Influenza(A/B) were developed- Laser diodes and LEDs were used as sources; free space or fibre-based light propagation mechanisms were exploited as a light transmission channel.
 7. **Dual Axis Laser Gauge Sensor for Puretronics, India, 2021**
 - Developed various laser scanning micrometry systems to measure the object's diameters between 0.01 mm - 200 mm. LightTools and TracePro were used for system modelling.
 8. **Hydrocarbon Leakage Sensor for ServersCheck, Belgium, 2020/2021**
 - A hydrocarbon detection sensor based on oil's fluorescence property was developed.

TECHNICAL SKILLS

- Hands-on Experience in Fiber Optics
- Utilization of various light sources in device modelling

- Optical Component Characterization
- Device Characterization
- Device prototyping and experimental verification of the optical device
- Device modelling using LightTools, TracePro and Zemax OpticStudio
- Polymer lens design (PMMA, Polycarbonate), Injection Molding for lens manufacturing

PUBLICATIONS

Muge Yucel, **Osman Akin**, Mehmet Cayoren, Ibrahim Akduman, Alagappan Palaniappan, Bo Liedberg, Gurkan Hizal, Fatih Inci, and Umit Hakan Yildiz, "Handheld Volatilome Analyzer Based on Elastically Deformable Nanofibers" Anal. Chem., DOI: 10.1021/acs.analchem.7b05187, March 20, 2018

Mustafa Umut Mutlu, **Osman Akin**, Mustafa M. Demir, Ümit Hakan Yildiz, "Fabrication of Polymer Nanofiber-Conducting Polymer Fabric and Noncontact Motion Sensing Platform" Materials Science Forum, March 2018, Trans Tech Publications, DOI: 10.4028/www.scientific.net/msf.915.207

Mustafa Umut Mutlu, **Osman Akin**, Ümit Hakan Yildiz, "Polymer nanofiber-carbon nanotube network generating circuits," Proc. SPIE 10529, Organic Photonic Materials and Devices XX, 105290R (21 February 2018)

Anıl İncel, Osman Akin, Ali Çağır, Ümit Hakan Yıldız, Mustafa M. Demir, "Smartphone assisted detection and quantification of cyanide in drinking water by paper-based sensing platform," Sensors and Actuators B: Chemical, Volume 252, 2017.

O. Akin and M. S. Dinleyici, "Demonstration of Pulse Controlled All-Optical Switch/Modulator," OSA Optics Letters, 39, 1469-1472, 2014.

O. Akin, M. S. Dinleyici, "An All-Optical Switching Based on Resonance Breaking with a Transient Grating", IEEE / OSA Journal of Lightwave Technology, vol.28, no.23, pp.3470-3477, Dec.1, 2010.

O. Akin, M. S. Dinleyici, "In Fiber Resonance Breaking Mechanism", Microwave Symposium (MMS), 2010 Mediterranean, pp.232-235, 25-27 Aug. 2010.

Dinleyici, M.S., **Akin, O.**, "Moire Effect Analysis in LCD Backlight Modules", IEEE 15th Signal Processing and Communication Applications Conference, Turkey, 11-13 June 2008.

Languages

Turkish: Native

English: C2 Level

Bulgarian: native

Russian: B1 Level

French: A2 Level