

Dr. Mykhailo Solovan



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Sex Male | Date of birth 15/11/1986 | Nationality Ukrainian

WORK EXPERIENCE

November 2020 – present
day

Associate Professor at the Department of Electronics and Energy Engineering
Chernivtsi National University, Chernivtsi, Ukraine, www.chnu.cv.ua

Courses:

- Solid state electronics (lectures, practical training),
- Fundamentals of scientific research (lectures),
- Physical methods of deposition of thin films for solar cells (lectures, laboratory works),
- Design and technology for the production of solar cells (laboratory works),

September 2015 – October
2020

Assistant Professor at the Department of Electronics and Energy Engineering
Chernivtsi National University, Chernivtsi, Ukraine, www.chnu.cv.ua

Courses:

- Elion technology (lectures, laboratory works),
- Fundamentals of scientific research (lectures, practical training),
- Thin films electronics (lectures, laboratory works),
- Design and technology for the production of solar cells (laboratory works),
- Modern methods for the investigation of semiconductor surface (lectures, practical training).

November 2015 –
April 2016

Erasmus Mundus Postdoctoral Fellow (Project EURO EAST)

Politecnico di Torino, Department of Applied Science and Technology, Torino, Italia,
www.polito.it

- Semiconductor heterojunctions for electronics and photovoltaics

July 2015 –
September 2015

Visiting Researcher

The University of Massachusetts Lowell, Kennedy College of Sciences,
Department of Physics and Applied Physics, Lowell, USA www.uml.edu

- Nanomaterials growth for optoelectronic device applications

October 2014 – July 2015

Head of a Laboratory at the Department of Electronics and Energy Engineering
Chernivtsi National University, Chernivtsi, Ukraine, www.chnu.cv.ua

- Deposition of different thin films (TiO₂, SnO₂, ZnO, TiN, CdTe, CuInS₂, Cu₂SnS₃, CuZnSnS₂) by means of the DC and RF magnetron sputtering, the electron-beam evaporation and spray pyrolysis techniques.
- Investigation of optical and electrical properties of thin films.
- Fabrication of different heterojunctions (TiO₂, SnO₂, ZnO, TiN / Si, CdTe, CdZnTe, CdHgTe, CuInS₂, Cu₂SnS₃, CuZnSnS₂, InSe, GaSe).
- Investigation of electrical and photoelectrical properties of heterojunction solar cells.

EDUCATION AND TRAINING

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- November 2020 **DSc (Habilitation) in Physics of Semiconductors and Dielectrics**
Chernivtsi National University, Chernivtsi, Ukraine
- November 2011 – October 2014 **PhD in Solid State Electronics**
Chernivtsi National University, Chernivtsi, Ukraine
- September 2010 – June 2011 **Master of Science in Physical and Biomedical Electronics**
Chernivtsi National University, Chernivtsi, Ukraine
- Semiconductor quantum structures and superlattices
 - Physics of nonequilibrium processes in semiconductors
 - Electronic medical facility
- September 2006 – June 2010 **Bachelor of Science in Electronic Devices and Systems**
Chernivtsi National University, Chernivtsi, Ukraine
- Physics of semiconductors and dielectrics
 - Physical electronics
 - Solid state electronics

 ADDITIONAL INFORMATION
RESEARCH PROJECTS
01/2020 – present

Principle Investigator

Heterojunctions based on thin films of graphite and graphene for use in electronics, solar energy and high energy particles detectors. State registration number 0120U101250.

Finances of the state budget of Ukraine.

Role in the project:

- Principle Investigator
- Fabrication and investigation of heterojunctions based on thin films of graphite and graphene.

01/2019 – 12/2019

Senior Researcher

High-quality surface barrier structures based on thin films of metal nitrides for electronics and photonics. State registration number 0119U100730.

Finances of the state budget of Ukraine.

Role in the project:

- Fabrication of different heterojunctions and Schottky diodes.
- Investigation of electrical and photoelectrical properties of semiconductor heterojunctions and Schottky diodes.

11/2015 – 11/2018

Participant of an International Collaborative Project “SENERA”

www.senera.org

Fabrication of CdTe-based diodes with a Schottky barrier (SfP-984705)

Finances by the NATO Science for Peace and Security Programme.

Role in the project:

- Fabrication of X- and γ -ray radiation detectors based CdTe and investigation their properties.

02/2016 – 12/2018**Senior Researcher**

Nanostructured semiconductor heterojunctions and Schottky diodes for electronics, optoelectronics and solar energy. State registration number 0116U001445. Finances of the state budget of Ukraine.

Role in the project:

- Growing nanowires on silicon
- Fabrication of different heterojunctions and Schottky diodes and investigation their electrical and photoelectrical properties.

07/2015 – 09/2015**Researcher**

Rapid thinning of GaN and SiC substrates for epi-ready and power devices by layer lift-off (US20150258769A1).

Finances of the state budget of US. (Phase 1 SBIR).

Role in the project:

- Cleavage of semiconductors substrate and investigation their structural properties.

01/2013 – 12/2015**Researcher**

Semiconductor heterostructure for electronics, optoelectronics and solar power (state registration number 0113U003241).

Finances of the state budget of Ukraine.

Role in the project:

- Deposition of different thin films.
- Fabrication of different heterojunctions
- Investigation of optical and electrical properties thin films.

Reviewer for:

- Scientific Reports (Nature Publishing Group)
- Journal of Alloys and Compounds (Elsevier)
- Journal of Physics and Chemistry of Solids(Elsevier)
- Materials Science in Semiconductor Processing (Elsevier)
- Semiconductor Science and Technology (Elsevier)
- Vacuum (Elsevier)
- Current Applied Physics (Elsevier)
- Optics Communications (Elsevier)
- Nanotechnology (IOP Publishing)
- Journal of Physics D: Applied Physics (IOP Publishing)
- Physica Scripta (IOP Publishing)
- Materials Research Express (IOP Publishing)
- Journal of Nanostructure in Chemistry (Springer)

- V V Brus, M I Ilashchuk, I G Orletskyi, **M M Solovan**, G P Parkhomenko, I S Babichuk, N Schopp, G O Andrushchak, A I Mostovyi and P D Maryanchuk. Coupling between structural properties and charge transport in nano-crystalline and amorphous graphitic carbon films, deposited by electron-beam evaporation. *Nanotechnology* 31 (2020) 505706 (IF = 3.551) <https://iopscience.iop.org/article/10.1088/1361-6528/abb5d4>
- V.V. Brus, O.L. Maslyanchuk, **M.M. Solovan**, P.D. Maryanchuk, I. Fodchuk, V.A. Gnatyuk, T. Aoki. Graphene/semi-insulating single crystal CdTe schottky-type heterojunction X- and γ -ray radiation detectors. *Scientific Reports* 9(1) (2019) 1065 (IF = 4.122) <https://www.nature.com/articles/s41598-018-37637-w>
- I.G. Orletskyi, M.I. Ilashchuk, **M.M. Solovan**, P.D. Maryanchuk, E.V. Maistruk, G.O. Andrushchak. Effect of fabrication conditions on charge transport and photo-response of n-ITO/p-Cd_{1-x}Zn_xTe heterojunctions. *Materials Research Express*. 6 (2019) 086219. (IF = 1.449) <https://iopscience.iop.org/article/10.1088/2053-1591/ab26f3>
- **M.N. Solovan**, G.O. Andrushchak, A.I. Mostovyi, T.T. Kovaliuk, V.V. Brus, P.D. Maryanchuk, Graphite/p-SiC schottky diodes prepared by transferring drawn graphite films onto SiC. *Semiconductors*, 52(2), (2018) 236-241 (IF = 0.691) <https://link.springer.com/article/10.1134/S1063782618020185>
- O. Maslyanchuk, **M. Solovan**, V. Brus, P. Maryanchuk, E. Maistruk, I. Fodchuk, V. Gnatyuk, T. Aoki, C. Lambropoulos, C. Potiriadis. Performance comparison of X- and γ -ray CdTe detectors with MoOx, TiOx and TiN schottky contacts. *IEEE Transactions on Nuclear Science*, 65(7), (2018) 1365-1370. (IF = 1.44) <https://ieeexplore.ieee.org/document/8361460>
- O.L. Maslyanchuk, **M.M. Solovan**, V.V. Brus, V.V. Kulchynsky, P.D. Maryanchuk, I.M. Fodchuk, V.A. Gnatyuk, T. Aoki, C. Potiriadis, Y. Kaissas. Capabilities of CdTe-based detectors with MoOx contacts for detection of X- and γ -radiation. *IEEE Transactions on Nuclear Science*; 64(5) (2017) 1168-72. (IF = 1.44) <http://ieeexplore.ieee.org/document/7902236/?reload=true>
- H. Parkhomenko, **M. Solovan**, V. Brus, E. Maistruk, P. Maryanchuk Structural, electrical, and photoelectric properties of p-NiO/n-CdTe heterojunctions. *Optical Engineering*, 57(1) (2018) 017116. (IF = 1.07) <https://doi.org/10.1117/1.OE.57.1.017116>
- O. Maslyanchuk, V. Kulchynsky, **M. Solovan**, V. Gnatyuk, C. Potiriadis, I. Kaissas, V. Brus. Diodes based on semi-insulating CdTe crystals with Mo/MoOx contacts for X- and γ -ray detectors. *Phys Status Solidi C*, 14(3-4) (2017) 1600232. (IF = 0.82) <http://onlinelibrary.wiley.com/doi/10.1002/pssc.201600232/abstract;jsessionid=F CAB1DABC50934D9731BF3F04328AA37.f02t02>
- **M.M. Solovan**, V.V. Brus, A.I. Mostovyi, P.D. Maryanchuk, I.G. Orletskyi, T.T. Kovaliuk, S.L. Abashin, Silicon nanowire array architecture for heterojunction electronics, *Semiconductors* 51(4) (2017) 542-548. (IF = 0.691). <https://link.springer.com/article/10.1134/S1063782617040200>
- **Solovan**, A.I. Mostovoi, S.V. Bilichuk, F. Pinna, T.T. Kovalyuk, V.V. Brus, E.V. Maistruk, I.G. Orletskii, P.D. Mar'yanchuk, Structural and optical properties of Cu₂ZnSn (S, Se)₄ films obtained by magnetron sputtering of a Cu₂ZnSn alloy target, *Physics of the Solid State* 59(8) (2017) 1643-1647. (IF = 0.95) <https://link.springer.com/article/10.1134/S1063783417080261>

- I.G. Orletskyi, **M.M. Solovan**, V.V. Brus, F. Pinna, G. Cicero, P.D. Maryanchuk, E.V. Maistruk, M.I. Ilashchuk, T.I. Boichuk, E. Tresso. Structural, optical and electrical properties of $\text{Cu}_2\text{ZnSnS}_4$ films prepared from a non-toxic DMSO-based sol-gel and synthesized in low vacuum. *Journal of Physics and Chemistry of Solids*. 100 (2017) 154–160 (IF = 2.048)
<http://www.sciencedirect.com/science/article/pii/S0022369716307740>
- **M.M. Solovan**, N.M. Gavaleshko, V.V. Brus, A.I. Mostovyi, P.D. Maryanchuk, E. Tresso,. Fabrication and investigation of photosensitive $\text{MoO}_x/\text{n-CdTe}$ heterojunctions. *Semiconductor Science and Technology*, 31 (2016) art. no. 105006 (IF = 2.207)
<http://iopscience.iop.org/article/10.1088/0268-1242/31/10/105006>
- **M.N Solovan**, A.I Mostovyi, V.V. Brus, P.D. Maryanchuk. Electrical and photoelectric properties of $\text{n-TiN/p-Hg}_3\text{In}_2\text{Te}_6$ heterostructures. *Semiconductors*, 50 (2016) 1020–1024. (IF = 0.691)
<http://link.springer.com/article/10.1134%2FS1063782616080236>
- V.V. Brus, I.S. Babichuk, I.G. Orletskyi, P.D. Maryanchuk, V.O. Yukhymchuk, V.M. Dzhagan, I.B. Yanchuk, **M.M. Solovan**, I.V.Babichuk Cu-Sn-S ternary compound thin films prepared by the low-cost spray-pyrolysis technique. *Applied Optics*, 55 (2016) B158-B162(IF = 1.598)
<https://www.osapublishing.org/ao/abstract.cfm?uri=ao-55-12-B158>
- **M.M. Solovan**, V.V. Brus, A.I. Mostovyi, P.D. Maryanchuk, E. Tresso, N.M. Gavaleshko. Molybdenum oxide thin films in CdTe -based electronic and optoelectronic devices. *Physica Status Solidi (RRL)*, 10 (2016) 346–349 (IF = 3.72)
<http://onlinelibrary.wiley.com/doi/10.1002/pssr.201600010/abstract;jsessionid=6FC05561568E1BE4781BD9EB34A5E275.f04t03>
- **Solovan M.N.**, Brus V.V., Maryanchuk P.D., Ilashchuk M.I., Kovalyuk Z. D. Temperature dependent electrical properties and barrier parameters of photosensitive heterojunctions $\text{n-TiN/p-Cd}_{1-x}\text{Zn}_x\text{Te}$, *Semiconductor Science and Technology* 30 (2015) 075006. (IF = 2.207)
<http://iopscience.iop.org/article/10.1088/0268-1242/30/7/075006>
- **M.M. Solovan**, V.V. Brus, P.D. Maryanchuk, M.I. Ilashchuk, J. Rappich, N. Nickel, S.L. Abashin, Fabrication and characterization of anisotype heterojunctions n-TiN/p-CdTe , *Semicond. Sci. Technol.* 29 (2014) 015007. (IF = 2.207) <http://iopscience.iop.org/0268-1242/29/1/015007/>
- **M.M. Solovan**, V.V. Brus, P.D. Maryanchuk, Electrical properties of anisotype heterojunctions n-CdO/p-Si , *Semiconductors* 48 (2014) 899-904. (IF = 0.691)
<http://link.springer.com/article/10.1134/S1063782614070203>
- **M.M. Solovan**, V.V. Brus, E.V. Maistruk, P.D. Maryanchuk, Electrical and optical properties of TiN thin films, *Inorganic Materials* 50 (2014) 40-45. (IF = 0.771) <http://link.springer.com/article/10.1134/S0020168514010178>
- **M.N. Solovan**, V.V. Brus, P.D. Maryanchuk, Isotype surface-barrier n-TiN/n-Si heterojunction, *Semiconductors* 48 (2014) 232-236. (IF = 0.691)
<http://link.springer.com/article/10.1134/S1063782614020274>

- **M.M. Solovan**, V.V. Brus, P.D. Maryanchuk, Features of the recombination losses of photocurrent in anisotype heterojunctions n-TiN/p-Si, *Semiconductors* 48 (2014) 1504-1506 (IF = 0.705)
<http://link.springer.com/article/10.1134/S106378261411027X>
- V.V. Brus, **M.M Solovan**, P.D. Maryanchuk, E.V. Maystruk, I.P. Kozyarskiy, K.S. Ulyanytskiy, J. Rappich, Features of the optical and electrical properties of polycrystalline CdTe films, prepared by thermal evaporation, *Physics of the Solid State* 56 (2014) 1947-1951 (IF = 0.95)
<http://link.springer.com/article/10.1134/S1063783414100072>
- **M. N. Solovan**, V. V. Brus, P. D. Maryanchuk, I. M. Fodchuk, V. M. Lorents, A. M. Sletov, M. M. Sletov, M. Gluba, Structural and photoluminescent properties of TiN thin films, *Optics and Spectroscopy*, . 117 (2014) 753–755 (IF = 0.801)
<http://link.springer.com/article/10.1134/S0030400X14110198>
-
- **M.N. Solovan**, V.V. Brus, P.D. Maryanchuk, Electrical and photoelectrical properties of anisotype heterojunctions n-TiN/p-Si, *Semiconductors* 47 (2013) 1174-1179. (IF = 0.691)
<http://link.springer.com/article/10.1134%2FS1063782613090248>
- **M.M. Solovan**, V.V. Brus, P.D. Maryanchuk, T.T. Kovalyuk, J. Rappich, M. Gluba, Kinetic properties of TiN thin films prepared by the reactive magnetron sputtering, *Physics of the Solid State* 55 (2013) 2234-2238. (IF = 0.95)
<http://link.springer.com/article/10.1134/S1063783413110255>
- **M. N. Solovan**, P.D. Maryanchuk, V.V. Brus, O.A. Parfenyuk, Electrical and optical properties of TiO₂ and TiO₂:Fe thin films, *Inorganic Materials* 48(10) (2012) 1026-1032 (IF = 0.771)
<http://www.springerlink.com/content/rv7m75w77v485057/>

Google Scholar Indicators:

<https://scholar.google.com/citations?user=nB3XVdQAAAAJ&hl=da>

h-index: 13; Total citations: 601

Scopus Indicators:

<https://www.scopus.com/authid/detail.uri?authorId=55382244600>

Total documents: 68;

h-index: 12; Total citations: 420

Patents

- **M.N. Solovan**, V.V. Brus, P.D. Maryanchuk, A.M. Kafanov: Heterophotodiode. Ukrainian Patent (No 80759 from 10.06.2013).
- **M.N. Solovan**, E.V. Maystruk, V.V. Brus, P.D. Maryanchuk, A.M. Kafanov: Photodiode-based p-Hg₃In₂Te₆. Ukrainian Patent (No 92085 from 25.07.2014).
- **M.N. Solovan**, V.V. Brus, P.D. Maryanchuk, M.I. Ilashchuk, K.S. Ulyanitsky: Photodetector n-TiN/p-CdTe. (No 92086 from 25.07.2014).
- **M.N. Solovan**, E.V. Maystruk, A.I. Mostovyi, P.D. Maryanchuk, V.V. Brus, T.T. Kovalyuk, I.P. Kozyarskiy, D.P. Kozyarskiy: A method of producing of Cu₂ZnSnS₄ (CZTS) thin films. (No 103918 from 12.01.2016).
- **M.N. Solovan**, A.I. Mostovyi, V.V. Brus, P.D. Maryanchuk, K.S. Ulyanitsky: Photodiode-based heterojunction MoOx/n-CdTe. Ukrainian Patent (No 116033 from 10.05.2017).

- A.I. Mostovyi, **M.N. Solovan**, E.V. Maystruk, T.T. Kovalyuk, P.D. Maryanchuk: A method of producing of thin films. (No 116079 from 10.05.2017).
- H.P. Parkhomenko, **M.N. Solovan**, Maryanchuk: Photodiode-based heterojunction p-NiO/n-CdTe. Ukrainian Patent (No 124902 from 10.05.2017).
- **M.N. Solovan**, A.I. Mostovyi,, V.V. Brus, P.D. Maryanchuk: Method of determining the active area of nanostructured surface-barrier heterostructures. Ukrainian Patent (No 134193 from 10.05.2019).

Conferences

Total number of international conferences: 36

5 most important conferences

- **M.M. Solovan**, V.V. Brus, P. D. Maryanchuk, M. M. Slyotov, A. M. Slyotov. Photoluminescence spectra of TiN thin films. Jaszowiec International School and Conference on the Physics of Semiconductors Krynica-Zdrój, Poland, 7- 12 June (2014)
- **M. N. Solovan**, V. V. Brus, P. D. Maryanchuk, Electrical properties of anisotype heterojunctions n-TiN/p-Hg₃In₂Te₆, *Microwave and Telecommunication Technology (CriMiCo), 2012 22nd International Crimean Conference*, Crimean, Ukraine, 6-12 Sept. (2015)
- **M.M. Solovan**, O.L. Maslyanchuk, P.D. Maryanchuk, V.V. Kulchynsky, V.A. Gnatyuk, T. Aoki, Electrical properties of MoO₃-based contacts to semiinsulating p-CdTe for application in X/γ-ray detectors, *E-MRS 2016 Fall Meeting*, Poland, 19-22 Sept. (2016)
- **M. M. Solovan**, J. Farah, T. T. Kovaliuk Heterojunction photodiode on cleaved SiC”, The 13th International Conference on Correlation Optics, “Correlation Optics’17” Chernivtsi, Ukraine 11-15 Sept. (2017)
- O. Maslyanchuk, **M. Solovan**, V. Brus, P. Maryanchuk, E. Mastruk, I. Fodchuk, V. Gnatyuk, T. Aoki, C. Lambropoulos, C. Potiradis. Performance comparison of X-and γ-ray CdTe detectors with MoO₃, TiO₂ and TiN schottky contacts. The 24th International Workshop on Room-Temperature Semiconductor Detectors (RTSD 2017), 2017 IEEE Nuclear Science Symposium & Medical Imaging Conference (2017 NSS/MIC), 21 – 28 October 2017, Atlanta, USA

Books

- P.D. Maryanchuk, A.I. Mostovyi, **M.N. Solovan**, V.V. Brus, *Heterostructures based on thin films of metal oxides with impurities of 3d elements*, Chernivtsi National University, Chernivtsi, 2017, p. 152. (in Ukrainian)
- P.D. Maryanchuk, **M.N. Solovan**, V.V. Brus, *Titanium nitride thin films and heterojunctions based on them*, Chernivtsi National University, Chernivtsi, 2018, p. 152. (in Ukrainian)

Tutorials

- P.D. Maryanchuk, **V.V. Brus**, *Solid-state electronics devices*, Chernivtsi National University, Chernivtsi, 2018, p. 220. (in Ukrainian)
- **M.N. Solovan**, A.I. Mostovyi, *Thin film electronics (guidance for laboratory works)*, Chernivtsi National University, Chernivtsi, 2019, p. 64. (in Ukrainian)