Dr. Waseem Amjad

01.11.2016-current
Assistant Professor
Energy Systems Engineering, Faculty of Agricultural Engineering and Technology,
University of Agriculture Faisalabad-Pakistan
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Links

Quick Highlights

Research articles published: 45 Book Chapters: 03 Patent: 02 granted
Research Projects: 03 as Principal Investigator, 03 as Co- Co- Principal Investigator and 03 as scientific member
Academic Experience: Before PhD (02 years and 08 months as Lecturer), post PhD (08 years as Assistant Professor) at university level.

Research Interests

Design, modelling, sensory evaluation and thermal analysis of bioprocesses for food preservation. Computer simulation (DEM, CFD) of conventional and new bioprocesses to study the characterization of the raw materials in terms of processing suitability and the impact of these processes on the nutritional and sensory quality of finished products.

Specific areas: Hyperspectral imaging, post-harvest techniques, Food system sustainability, Process optimization, exergetic based thermal analysis of bioprocesses, Solar thermal applications in bioprocesses, IoT for monitoring and optimizing bioprocesses, 3D modeling and simulation (ANSYS; CFD and DEM)

Qualification

2022-2023	Postdoc *(Fulbright Fellowship)* Particulate Products and Processes (CP3) Lab, Department of Agricultural & Biological Engineering, Purdue University, USA
2012-2016	Ph.D. Agricultural & Biosystems Engineering *(DAAD Fellowship)* Department of Agricultural & Biosystems Engineering, Witzenhausen Campus, University of Kassel, Germany *(Grade 1.0)*
2007– 2009	M.S. Mechanical Engineering (CGPA: 4.25/4.50) Department of Engineering Management and Design, Myong-Ji University, South Korea
2002– 2006	B.Sc. Agricultural Engineering (CGPA: 3.43/4.00) University of Agriculture, Faisalabad, Pakistan

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Professional Experience

Post held	Where employed	Duration		Brief description of the job (Teaching/Research/ Administrative)
		From	To	
Assistant Professor	Faculty of Agri. Engineering & Technology, University of Agriculture Faisalabad, Pakistan	01.11.2016	Date (till 28.02.2025)	Teaching, Research, Student supervision, Administrative and advisory tasks
Lecturer	Faculty of Agri. Engineering & Technology, University of Agriculture, Faisalabad, Pakistan	01.10.2009	31.05.2012	Teaching and Research, Administrative tasks
Research Assistant	CATech Clean Air Technology Kyung-do 449-728 South Korea	01.12.2007	30.11.2008	Computational analysis of regenerative furnaces for industrial heating process
Workshop Engineer	Jamal Din Wali (JDW) Sugar Mills, Sadiqabad, Pakistan	1.09.2006	31.01.2007	Maintenance department (machineries & equipment)

Work experience during PhD

01.09.2015 – 31.12.2015

Worked in a research project entitled "Sus-Organic" supervised by Dr. Barbara Sturm (Head of Post-Harvest Technologies at Department of Agricultural & Biosystems Engineering, University of Kassel, Germany). This research project dealt with technical solutions and standard operation procedures leading to increased product quality health whilst reducing resource consumption with respect to raw materials and energy. In this project, I did the following jobs,

- An imaging system (moveable) had designed for non-destructive measurement of real time data in large drying units.
- Hyperspectral imaging (HSI) technique had applied during convective food drying process for vegetable (potato) and fruit (apple) for moisture prediction to control the process.

01.10.2012 – 30.09.2015

Worked in a collaborative research project "Design of Energy Efficient Bioprocessing Units" with a well-known German FOOD drying company **INNOTECH *GmbH,*** Germany. As a researcher, I performed modelling and simulation of different system designs using ANSYS software with respect to system structural strength and performance analysis (fluid flow).

Courses Taught

Undergraduate: Heat and Mass Transfer, Principles of Energy Engineering, Energy in Food Processes, Operation Research

Postgraduate: Energy Systems Modelling and Simulation, Agro-Industrial Processes, Fluid Flow and Heat Transfer

Student supervision

- **17** M.Sc. students supervised as a major supervisor
- **24** M.Sc. students supervised as a member of supervisory committee
- **15** undergraduate students supervised as a major supervisor in their Final Year Design Projects (FYDP).

- **01** PhD student

Publications (selected)

Sr. no.	Authors	Title	Journal detail
1	Amjad W, Chen Z, Ambrose K,	Design assessment of grain inverters in cross-flow grain dryer via CFD-DEM numerical simulation	Biosystems Engineering 239:147-157 (2024) https://doi.org/10.1016/j.biosystemseng.2024.02.008
2	Amjad, W., Christon, S., Munir, A., Hensel, O., Sturm, B.	Hyperspectral imaging for the determination of potato slice moisture content and chromaticity during the convective hot air drying process.	Biosystems Engineering, (2018) 166: 170 -183 https://doi.org/10.1016/j.biosystemseng.2017.12.001
3	Moscetti, R., Sturm, B., Crichton, S.O.J., Amjad, W., Massantini, R.	Postharvest Monitoring of Organic Potato (CV. Anuschka) During Hot-Air Drying Using Vis/Nir Hyperspectral Imaging.	J. Sci. Food Agriculture, (2017) 98 (7) 2507-2517 https://doi.org/10.1002/jsfa.8737
4	Amjad, W., Munir, A., Esper, A., Hensel, O.	Spatial homogeneity of drying in a batch type food dryer with diagonal airflow design.	Journal of Food Engineering, (2015) 144 (1) 148–155. doi.org/10.1016/j.jfoodeng.2014.08.003
5	Amjad, W., Hensel, O. Munir, A., Esper, A., Sturm, B.	Thermodynamic analysis of drying process in a diagonal-batch dryer developed for batch uniformity using potato slices.	Journal of Food Engineering, (2016) 169:238-249. https://doi.org/10.1016/j.jfoodeng.2015.09.004
6	Amjad, W., Hensel, O., Munir, A. Esper, A.	Batch drying of potato slices: Kinetic changes of color & shrinkage in response of uniformly distributed drying temperature. Agricultural Engineering International:	Agricultural Engineering International: CIGR Journal, (2015) 17(3) 296-308
7	Amjad, W., Munir, A. Sturm, B.	Development of an imaging system for spatially real-time measurement of drying parameters in industrial drying units.	Agricultural Engineering International: CIGR Journal (2020), 22 (4):238-249.
8	Amjad, W., Waseem, M. Munir, Ghafoor A., A., Asghar, F., Gilani, G.A.	Solar assisted dehydrator for decentralized controlled and homogeneous multi-product drying.	Journal of Solar Energy Engineering, (2020), 143 / 011011-1 https://doi.org/10.1115/1.4047671
9	Amjad, W., Gilani, G.A., Munir, A., Asghar, F., Ali, A., Waseem, M.	Energetic and Exergetic thermal analysis of an inline-airflow solar hybrid dryer	Applied Thermal Engineering, (2020), 166, 5 https://doi.org/10.1016/j.applthermaleng.2019.114632
10	Amjad, W.; Raza, M.A.; Asghar, F.; Munir, A.; Mahmood, F.; Husnain, S.N.; Hussain, M.I.; Kim, J.-T.	Advanced Exergy Analyses of a Solar Hybrid Food Dehydrator.	Energies 2022, 15, 1505. https://doi.org/10.3390/en15041505
11	Amjad, W; Munir, A; Akram, A; Parmar, A; Precoppe, M; Asghar, F.	Decentralized solar-powered cooling systems for fresh fruits and vegetables to reduce postharvest losses in developing regions: a review	Clean Energy, 7(3),2023, 635–653, https://doi.org/10.1093/ce/zkad015
12	Hasan, M.U., Malik, A.U., Ali, S., Imtiaz, A.,	Modern drying techniques in fruits and vegetables to overcome postharvest	Journal of Food Processing and Preservation, (2019)

	Munir, A., Amjad, W., Anwar, R.	losses: A Review	2019;00:e14280. https://doi.org/10.1111/jfpp.14280
13	Khan, K.S., Amjad, W., Munir, A., Hensel, O	Improved solar milk chilling system using variable refrigerant flow technology (VRF).	Solar Energy, (2020) 197: 317–325. https://doi.org/10.1016/j.solener.2020.01.014
14	Husnain, S.N.; Amjad, W.; Munir, A.; Hensel, O.	Energy and Exergy Based Thermal Analysis of a Solar Assisted Yogurt Processing Unit	Frontiers in Energy Research, 2022, 10:887639. https://doi.org/10.3389/fenrg.2022.887639
15	Husnain, S.N.; Amjad, W.; Munir, A.; Hensel, O.	Development and Experimental Study of Smart Solar Assisted Yogurt Processing Unit for Decentralized Dairy Value Chain.	Sustainability 2022, 14, 4285. https://doi.org/10.3390/su14074285
16	Husnain, S.N.; Anjum Munir, A; Amjad, W; Majeed, F; Hensel, O.	Comparative quality analysis and economic feasibility of solar assisted yogurt processing unit for decentralized dairy value chain	Scientific Reports 13, 6878 (2023). https://doi.org/10.1038/s41598-023-34032-y
17	Ayub, I., Munir, A., Ghafoor, A., Amjad, W., Nasir, M.S.	Solar Thermal Application for Decentralized Food Baking Using Scheffler Reflector Technology	Journal of Solar Energy Engineering, (2018) 140(6): 061005 https://doi.org/10.1115/1.4040206
18	Ayub, I., Munir, A., Amjad, W., Ghafoor, A., Nasir, M.S.	Energy- and exergy-based thermal analyses of a solar bakery unit.	Journal of Thermal Analysis and Calorimetry, (2018), 133, 1001–1013 https://doi.org/10.1007/s10973-018-7165-3
19	Munir, A., Hensel, O., Scheffler, W., Hoedt, H., Amjad, W., Ghafoor, A.	Design, development and experimental results of a solar distillery for the essential oils extraction from medicinal and aromatic plants	Solar Energy, (2014) 108:548–559. doi.org/10.1016/j.solener.2014.07.028
20	Munir, A.; Ashraf, T.; Amjad, W.; Ghafoor, A.; Rehman, S.; Malik, A.U.; Hensel, O.; Sultan, M.; Morosuk, T.	Solar-Hybrid Cold Energy Storage System Coupled with Cooling Pads Backup: A Step towards Decentralized Storage of Perishables.	Energies, (2021) 14, 7633. https://doi.org/10.3390/en14227633
21	Afzal, A., Munir, A., Amjad, W., Jorge L. Alvarado, J.L., Umair, M., Azam, M. Anjum, M.N	Use of perforation and mathematical modeling to increase solar based steam distillation system efficiency.	Journal of Solar Energy Engineering, (2021) 143(6): 061008 https://doi.org/10.1115/1.4051316
22	Munir, A., Mahmood, F., Amjad, W., Ahmad, S.A.	Thermal analysis of a solar hybrid dehydrator designed for uniform multi-product drying.	Journal of Thermal Science and Engineering Applications (2021), 13(6): 061016 https://doi.org/10.1115/1.4050232

News highlights

Research on HSI has been highlighted by ATSAF Germany, under project "Competence against hunger and poverty Food for thought" https://www.youtube.com/watch?v=m6FPi42mHyQ&t=618s

Patents Awarded

Sr. No.	Patent title	Applicants	Patent No.	Patent & Design Office
1	Solar hybrid dehydrator for spatial homogeneous multi-product drying.	Dr. Waseem Amjad, Mr. Muhammad Arshad, Dr. Anjum Munir, Engr. Muhammad Waseem.	**143990** published on 22.07.2022 https://ipo.gov.pk/system/files/220722_0.pdf	Intellectual Property Organization (IPO) of Pakistan
2	Solar cold storage for decentralized preservation of perishables using cooling pads	Dr. Anjum Munir, Mr. Mian Ali Mehmood, Dr. Abdul Ghafoor, Dr. Waseem Amjad, Engr. Tallha Ashraf.	**143974** published on 04.06.2022 https://ipo.gov.pk/system/files/220604.pdf	

Book Chapters Published

1. Anjum Munir, Allah Bakhsh, Abdul Ghafoor, **Waseem Amjad,** Umar Farooq. "Rural Energy Solutions for Community Development". In book: *Developing Sustainable Agriculture in Pakistan* Edition: First, *April 17, 2018* Publisher: CRC Press Taylor & Francis Group ISBN 9781351208222 Editors: Iqrar Ahmad Khan, Muhammad Sarwar Khan
2. Anjum Munir, Oilver Hensel, Abdul Ghafoor, **Waseem Amjad.** "Providing Rural Areas with Decentralized Energy". In book: *Decent Work Deficits in Southern Agriculture: Measurements, Drivers and Strategies (pages 291-303)*· · Edition: First, *February 2018* Publisher: Rainer Hampp Verlag Augsburg, München Vorderer Lech 35 86150 Augsburg, Germany. ISBN 978-3-86618-896-9 Editors: Christoph Scherrer, Santosh Verma.
3. Anjum Munir, Abdul Ghafoor, **Waseem Amjad,** Adeel Ashraf and Oilver Hensel, "Occupational Health and Safety in Pakistan's Sugar Mills". In book: *Occupational Safety and Health Challenges in Southern Agriculture (pages 65-76)*· Edition: First, *April 2019* Publisher: Rainer Hampp Verlag Augsburg, München Vorderer Lech 35 86150 Augsburg, Germany. ISBN 978-3-95710-247-8 Editors: Christoph Scherrer, Katja Radon.

Research Projects Executed

Sr. No	Project Title	Funding Agency	Worth	Duration	Role	Present Status
1	Development of Solar Thermal Energy Storage System at medium temperature using Phase Change Material (PCM) for continuous on-farm decentralized food processing	International Center for Development and Decent Work (ICDD), Germany	5000 Euro	One year (May 2021-April 30, 2022)	Co-Principle Investigator	Completed
2	Design, Development and Computational Modeling of a Solar Assisted Cold Storage System for the Preservation of Perishables Agricultural Products	Pakistan Agricultural Research Council (PARC) under Agricultural Linkages Programme (ALP), Islamabad	5.448 Million PKR	Three years (July 01, 2018-June 30, 2021)	Principle Investigator	Completed
3	Design and development of solar hybrid seed dryer (SHSD) using ANSYS	Higher Education Commission (HEC) of Pakistan under Technology Development Fund	3.8205 Million PKR	Two Years (Nov.01. 2017-October 31, 2019)	Principle Investigator	Completed
4	Numerical and experimental based optimization of design and operating conditions of solar-based innovative food processing technologies (prototypes) for outreach	Higher Education Commission (HEC) Pakistan, Start-Up Research Grant Program.	0.5 Million PKR	One Year (2017-18)	Principle Investigator	Completed
5	Income generation through development and indigenization of e-pedelec rickshaw and solar assisted milk powder machine for rural community	International Center for development and decent work (ICDD) Germany	15000 Euro	One Year (2016-17)	Co-Principle Investigator	Completed
6	Development of solar assisted multi-crop dryers and energy efficient storage structures for value addition and food security	US-Pakistan Center for Advanced Studies (USPCAS) in Agricultural Food Security (AFS)	75000 US$	2017-19	Scientific Member	Completed
7	Development of innovative technologies to reduce postharvest losses in cereals, oil seeds and pulses	Higher Education Commission (HEC) of Pakistan under Technology Development Fund	6.2659 Million PKR	Two Years (July 2017-June 30, 2019)	Co-Principle Investigator	Completed
8	Public awareness campaign for recycling home garbage employing waste to energy concept	Higher Education Commission (HEC) of Pakistan under Social Integration	1.0 Million PKR	Two Years (2018-December 2019)	Coordinator	Completed

		Outreach Program (SIOP)				
9	Strengthening vegetables value chains in Pakistan (SVVCP) for greater community livelihood benefits	Australian-Pakistan Center for International Agricultural Research (ACIAR)	27.84 Million PKR	Three years 2018-21	Member	Completed
10	Development of Quality Oriented Solar Assisted Diagonal Batch Dryer for Perishable Products	Higher Education Commission (HEC) of Pakistan under National Research Program for Universities (NRPU).	3.014 Million PKR	Two years (November , 2017-19)	Member	Completed

Conferences Publications (Peer Reviewed):

1. **Conference paper:**
   Amjad, W.; Nawaz, A.; Munir, A.; Mahmood, F. Hybrid Nanofluid-Based Thermal Fluid–Structure Interaction (FSI) Investigations for the Thermal Management System of a Computer Microprocessor. *Engineering Proceedings*. 2021, 12(1):30 https://doi.org/10.3390/engproc2021012030

2. **Conference paper:**
   Amjad W, Akram F, Rehman S, Munir A, Manzoor O. Thermal Analysis of a Solar Assisted Cold Storage Unit for the Storage of Agricultural Perishables Produce. *Engineering Proceedings*. 2021; 12(1):24. https://doi.org/10.3390/engproc2021012024

3. **Conference paper:**
   Amjad W, Shahid M, Munir A, Asghar F, Manzoor O. Energy Assessment of a Combined Cycle Power Plant through Empirical and Computational Approaches: A Case Study. Engineering Proceedings. 2021; 12(1):25. https://doi.org/10.3390/engproc2021012025

4. **Amjad, W**., Hensel, O. (2013). Value addition of food through innovative drying process: International Research on Food Security, Natural Resource Management and Rural Development Tropentag, 2013, University of Hohenheim, Germany. ISBN: 978-3-95404-498- 6

5. Munir, A., **Amjad, W**., Hensel, O. (2013). Solar based oils extraction from medicinal plants. Sun New Energy Conference (SUNEC) September 10-12, 2013, Sicily, Italy, ASIN: B00F2S8DSQ

6. **Amjad, W.,** Hensel, O. (2013). Application of computational fluid dynamics (CFD) for the prediction of fluid flow in a newly designed batch type food dryer. International Conference on Renewable Energy Technologies in Pakistan, 1-3 October, 2013. ISBN 978-969-9035-05-0

7. **Amjad, W.,** Hensel, O. (2013). Effect of spatial non-homogeneous fluid flow in food drying machines/dryers through CFD. II. International Food Research and Development Brokerage conference, Izmir, Turkey, 03-04 June, 2013.

8. **Amjad. W.,** Miran, S. (2011). Computational Modeling for uniform temperature distribution for Food Processing. International conference on Mechanized Farming in Pakistan: Crop Production and Technologies". University of Agriculture, Faisalabad, Pakistan. pp 87-95.

9. **Abstract:**
   Waseem Amjad, Anjum Munir, Abdul Ghafoor, Umair Sultan and Nabeel Husnain. "Renewable energy: Issues and challenges for Pakistan" abstract published in: Proceedings of "International

Symposium: Global Value Chain and Decent Work Deficit in Agriculture" held on ***December 1-2, 2017***, at U.S.- Pakistan Center for Advanced Studies in Agriculture and Food Security in University of Agriculture, Faisalabad.

10. **Abstract:**

Waseem Amjad, Stuart Crichton, Anjum Munir1, Oliver Hensel, Barbara Sturm, Syed Nabeel Husnain. Use of hyperspectral imaging (HSI) for energy optimization of an industrial drying process. Abstract published in: Proceedings of "International Workshop on Sustainable Energy Solutions for Community Development in Pakistan" held on November 08-09, 2016, University of Agriculture, Faisalabad, pp. 10.

Professional Skills and Awards

Awards:

1. PhD scholarship provided by German Academic Exchange Service (DAAD) from October 2012-July 2016
2. MS. Scholarship under the title "Two years of MS Level study/training in Korean Universities and Industry" in Korea by Higher education commission (HEC) of Pakistan.
3. International Student Scholarship award throughout Master Degree in Myongji University South Korea.
4. University Merit Scholarship award throughout graduate degree in Agricultural University Faisalabad, Pakistan

Engineering Computational Skills:

- **CAD software:** Pro Engineering, Solid works,
- **Simulation tools:** ANSYS Workbench (CFX, CFD, DEM)
- **Design and data analysis tools:** Design Expert, Sigma plot, SPSS

Memberships/License:

1. Registration in Pakistan Engineering Council (PEC) PEC/NO: AGRI-2822 (Life Time)
2. Member of German Academic Exchange Service (DAAD) Alumni ID No: 91540549
3. Councilor of Student Branch IEEE-UAF (Branch Code STB10105, School Code:41640860)
4. Remained member of Society of International Students Witzenhausen Germany
4. Remained member of Korean Society of Combustion (KOSCO)
5. Member of Pakistan Society of Agricultural Engineers (PSAE) (Life Time)

Outreach/Community Service/Extension

(Seminars/Workshops/Conferences/Trainings/Symposia/Field days/Shows/Collaborations)

Participation in scientific activities

1. Participated in an International German Academic Exchange Services (DAAD) Alumni Seminar *"Photovoltaic: Opportunity for climate and nature protection in agriculture and rural areas"* and the trade fair The Smarter E Europe at University of Siegen, ***Germany*** from ***March 18-30, 2024***.

2. Participated as speaker in "1st International Conference on Water, Energy, and Environment for Sustainability (IC-WEES) 2021" with a priority theme "Biotechnologies for Environment, Health and

Agriculture" held on October, 27-29, 2021 at Atta-ur-Rahman School of Applied Biosciences (ASAB) National University of Sciences and Technology (NUST), Pakistan

3. Participated and presented paper titled "Thermal Analysis of a Solar Assisted Cold Storage Unit for the Storage of Agricultural Perishables Produce" at "1st International Conference on Energy, Power and Environment" 11–12 Nov 2021, Gujrat University, Gujrat Punjab, Pakistan.

4. Presentation at 12th International Agriculture Symposium "AGROSYM 2021" held on 7-10 October 2021. Jahorina mountain (Bosnia and Herzegovina), titled "Modelling of unsteady spatially distributed food drying parameters assessed non-destructively (food imaging) in a small industrial food dryer".

5. Participated and presentation at a Symposia on "Public awareness campaign for recycling home garbage employing waste to energy concept" on December 24, 2019 at CAS Auditorium UAF.

6. Participated in an International German Academic Exchange Services (DAAD) Alumni Seminar *"Sustainable Food Production and Food Security in Developing Countries- Quality Management and Resource Use Efficiency along Agri-Value Chains"* and Anuga FoodTec 2018 in cooperation with the German Institute for Tropical and Subtropical Agriculture, and Transdisciplinary and Social ecological Land use Research (DITSL) at University of Kassel, ***Germany*** from ***March 11-24, 2018***.

7. Participated in two days training workshop "Outcome based Education" held on ***November 29-30, 2018*** at CAS-AFS University of Agriculture, Faisalabad. Resource Person: Mr. Azlan Abdul Aziz, Board of Engineers, Malaysia.

8. Being a Focal Person for Outcome Based Education (OBE) training in the faculty, organized and participated in training workshop "Outcome based Education" held on ***September 10, 2018*** at CAS-AFS University of Agriculture, Faisalabad. Resource Person: Dr. Taki Ahmad Cheema, GIKI Sawabi, Pakistan.

9. Participated as Resource person to conduct "one day practical demonstration workshop on energy efficient fruits and vegetables processing dehydration" held on ***September 23, 2018*** organized by a dryer manufacturing industry PAMICO Technologies Faisalabad, Pakistan.

10. Participated in Continuing Professional Development Program "Sustainable Energy Solution for Community Development in Pakistan" held on November 9, 2016 organized by Department of Energy Systems Engineering UAF (CPD points=0.5)

11. Oral presentations entitled "Quality Oriented Energy Efficient Seed Drying" in 2nd Pakistan SEED Congress, seed security for sustainable agriculture" organized by U.S.-Pakistan Center for Advanced Studies in Agriculture and Food Security (USP-CAS) held on **November 21-22, 2016.**

Conference/workshops Organized

1. As Focal person, organized workshop on "Arduino Core Development Workshop"" under the umbrella of IEEE-UAF student branch held on December 26, 2020.
2. Organized workshop on ""A guide to Scholarship Hunting for graduate school" under the umbrella of IEEE-UAF student branch on July 17, 2021
3. As Advisor (Focal person), organized a workshop on "Entrepreneurial Development" at Main Library Conference Room held on December 23, 2019 at UAF under the umbrella of IEEE-UAF student branch

4. Organized Symposia on "Public awareness campaign for recycling home garbage employing waste to energy concept" on December 24, 2019 at CAS Auditorium UAF.
5. As Workshop Joint Secretary, organized International Workshop on "Sustainable Energy Solutions for Community Development in Pakistan" under the International Center for Decent Work and Development (ICDD) German funded project at UAF in **November 08-09, 2016.**
6. Edited abstract book on "Sustainable Energy Solutions for Community Development in Pakistan" ISBN: 978-969-9035-13-5

Community service

1. Successfully launched Institute of Electrical and Electronics Engineers (IEEE) Student branch in the University named as **IEEE-UAF** as ***Branch Advisor*** (IEEE ID 94568531) on ***January 31, 2018.*** The Institute of Electrical and Electronics Engineers (IEEE) is a professional association with its corporate office in New York City and its operations center in Piscataway, New Jersey. IEEE -The world's largest technical professional organization that provide platform for students and stakeholders to share their ideas, competitions etc.

2. Provided technical consultancy to a food dryer manufacturing company PAMICO Technologies in one of its projects in Gilgit Biltistan State of Pakistan as ***Technical Coordinator***. ***August 13-17, 2018***

Industrial collaborations

Sr. No.	Name of industry	Address	Scope of collaboration
1	UA Technologies International LLC USA	Purdue Technology Park 1281 Win Hentschel Blvd, Suite 1300 *West Lafayette, IN 47906-4360, USA*	Research and development Combined work to providing a sustainable food drying solution https://juatechnology.com/
2	PAMICO Technologies (Pvt) Ltd.	Glulam Rasool Nagar, Street # 1 Al-Mason Town Sumundri Road Faisalabad, Pakistan	Research and development • Worked as Industrial partner in a research project funded by Higher Education Commission (HEC) of Pakistan under Technology Development Fund (2017-2019) • Jointly promoted and installed solar dehydrators in Northern area (Gilgit) of Pakistan • Organized workshops together for the promotion of solar thermal applications for value addition in agriculture
2	POWER PACK Energy (Pvt) Ltd.	Office No. 03, Rehman Centre-2, Near DHA Phase underpass, Service Lane, Lahore, Pakistan	• Worked as Industrial partner in a research project funded by Pakistan Agricultural Research Council (PARC) (2018-2021). • Service agreement is in process for commercial use of developed solar cold storage facility under PARC project.

Academic collaborations

Sr. No.	Name of Organization	Focal person and Address	Scope of collaboration
1	Food and Markets Department, Natural Resources Institute, University of Greenwich United Kingdom	Dr. Aditya Parmar Senior Crop Postharvest Scientist	Research and scientific extension • Joint project preparation and submission under Innovate UK - GOV.UK • Jointly launched special issue Frontiers in Sustainable Food Systems https://www.frontiersin.org/research-topics/38905/harvesting-the-sun-decentralized-food-handling-and-processing-to-support-sustainable-agriculture-and#overview
2	Green Energy Technology Research Center, Kongju National University, South Korea	Dr. M. Imtiaz Hussain, Cheonan 31080, South Korea	Research and scientific extension • Joint project preparation • Jointly launched special issue in Energies-MDPI https://www.mdpi.com/journal/energies/special_issues/Photovoltaic_Thermal_Systems_Assessment
3	Leibniz Institute for Agricultural Engineering and Bioeconomy, Potsdam, Germany	Prof. Dr. Barbara Sturm, Max-Eyth-Allee 100, 14469 Potsdam, Germany	• Joint project preparation • Working as member of editorial board https://www.sciencedirect.com/journal/thermal-science-and-engineering-progress/about/editorial-board
4	Atta-ur-Rehman School of Applied Biosciences, National University of Sciences and Technology (NUST),	Dr. Khurram Yousaf, Sector H-12, Islamabad, Pakistan	• Joint project preparation and submission Submitted project in "CPEC- Collaborative Research Grant (CPEC-CRG)" for 36 months. • Joint publications

Administrative/Advisory services

Look after duties of head of the Department

1. Assisted Dean, Faculty of Agri. Engineering and Technology (FAET) in looking after the ***duties of Chairman***, Dept. of Energy Systems Engineering for a period of four months (***June 01, 2018-September 30, 2018***).
2. Assisted Dean, FAET in looking after the **duties of Chairman**, Dept. of Energy Systems Engineering during the period of **10.09.2017-23.09.2017.**

Member committee of scientific activity

1. Notified from Vice Chancellor office: Developing proposals on Agricultural Robotics relevant to the identified area in collaboration with National Center of Robotics and Automation, Department of Mechatronics, NUST Islamabad.

2. Notified from Vice Chancellor office: Serving as team member a Sub-component-Postharvest of a Australian Center for International Research (ACIR) funded project, commissioned by CABI-Pakistan

3. Worked as member of committee (coordination and accommodation) for organizing an International symposium "Global value chain and decent work deficit in agriculture" held on December 1-2, 2017 at AFS-CAS UAF.

Journal/Magazine Editor /Subject editor

1. Serving as Guest Editor for the Special Issue "New Insights into Techno-Economic and Environmental Assessment of Photovoltaic/Thermal Systems" in journal "Energies" MDPI

   https://www.mdpi.com/journal/energies/special_issues/Photovoltaic_Thermal_Systems_Assessment#info

2. Serving as member of the Editor Board for the journal "Thermal Science and Engineering Progress" Elsevier

   https://www.sciencedirect.com/journal/thermal-science-and-engineering-progress/about/editorial-board

Advisory services

1. Served as ***"Advisor"*** of B.Sc. 8th, 9th and above Semesters for all undergraduate engineering degree programs being offered in the Faculty of Agri. Engineering and Technology during the academic year 2020-2021.

2. Served as ***"Co-Advisor"*** for students of M.Sc. Energy Systems Engineering being offered in the Department of Energy Systems Engineering, Faculty of Agri. Engineering and Technology during the academic year 2021-2022.

3. Served as ***Co-Tutor*** of Tutorial group (30 students of undergraduate degree programs) w.e.f. November 13, 2017 to date.

4. Served as an ***"Advisor"*** of B.Sc. students 5th, 6th and 8th Semesters for all undergraduate engineering degree programs being offered in the Faculty of Agri. Engineering and Technology to sign UG-1 forms, Library/Student ID cards application forms, railway/PIA concession forms, scholarship/loan forms, Character Certificate forms and registration forms etc. on behalf of the Dean.

5. Served ***as member of Faculty Board of Studies*** nominated by Departmental Board of Studies (BOS)

6. Served as LMS-Manager in the Department for the creation of courses and assigning respective teachers to those courses for online attendance, uploading leaning material etc.

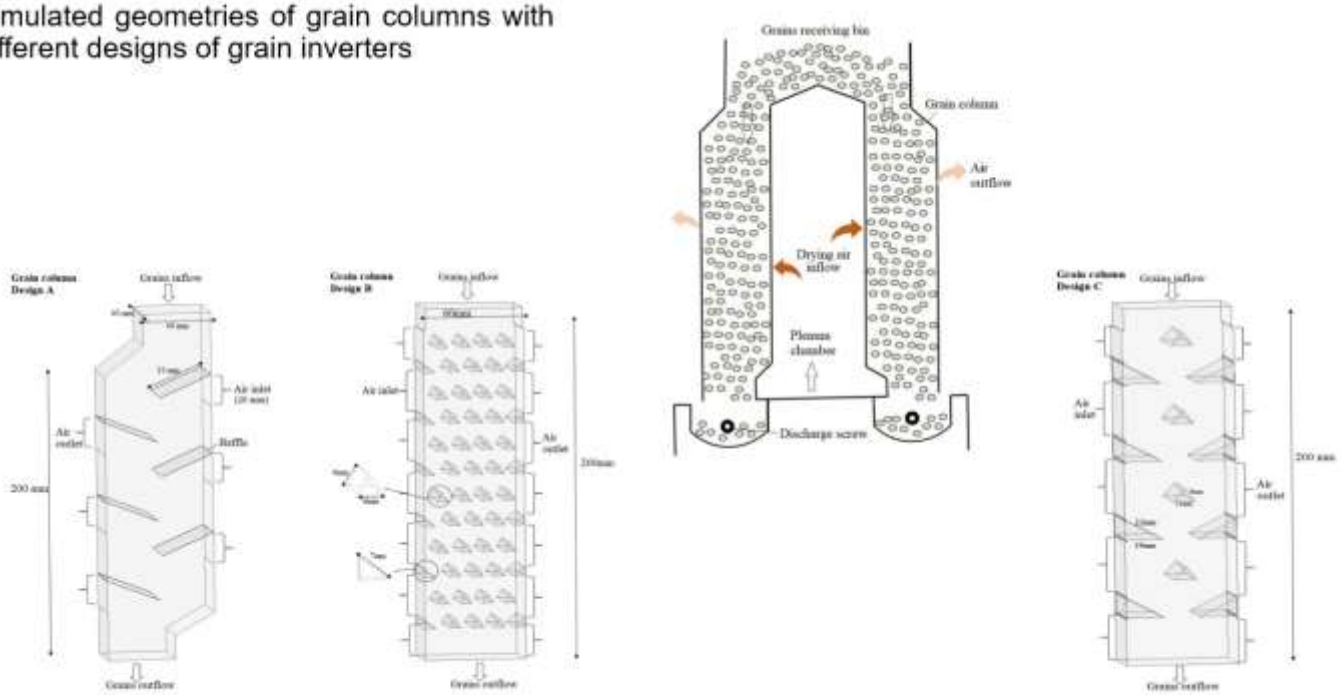
7. Served as member of Scrutiny committee of M.Sc. Agricultural Engineering students who are conducting their research work in the Dept. of Energy Systems Engineering.

8. Served as **Convener** of Scrutiny committee for postgraduate thesis in the discipline of M.Sc. Energy Systems Engineering, Dept. of Energy Systems Engineering.

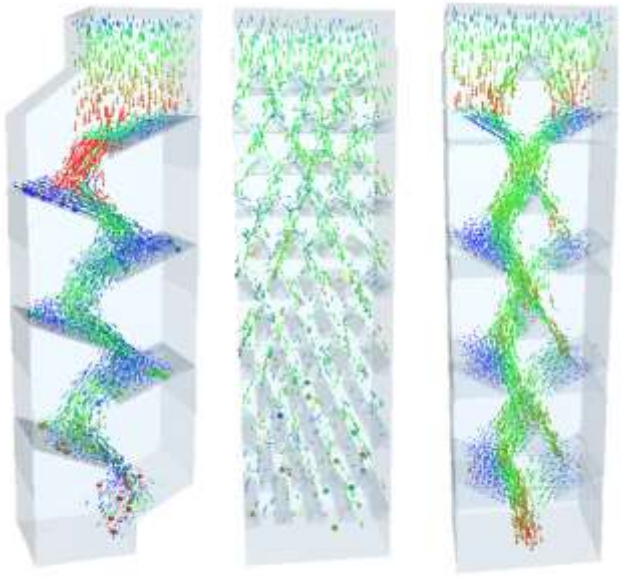
Research Work highlights

1- Computational modelling of food grain/particles drying process to predict change in particle moisture contents with respect to change in its temperature along with volume shrinkage

Simulated geometries of grain columns with different designs of grain inverters

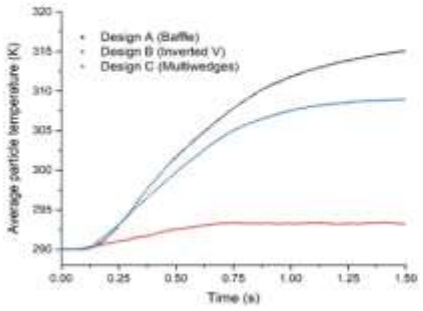


Schematic of crossflow grain dryer (a) showing three different column designs with baffle plates (Design A) inverted V sections (Design B) and multiwedge (Design C) studied for the inversion of downward moving grains.

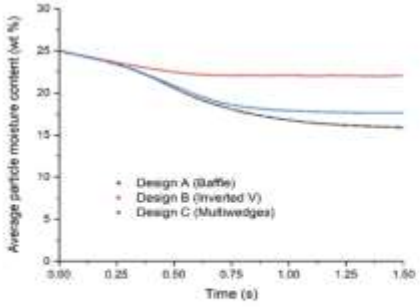


Grain flow pattern

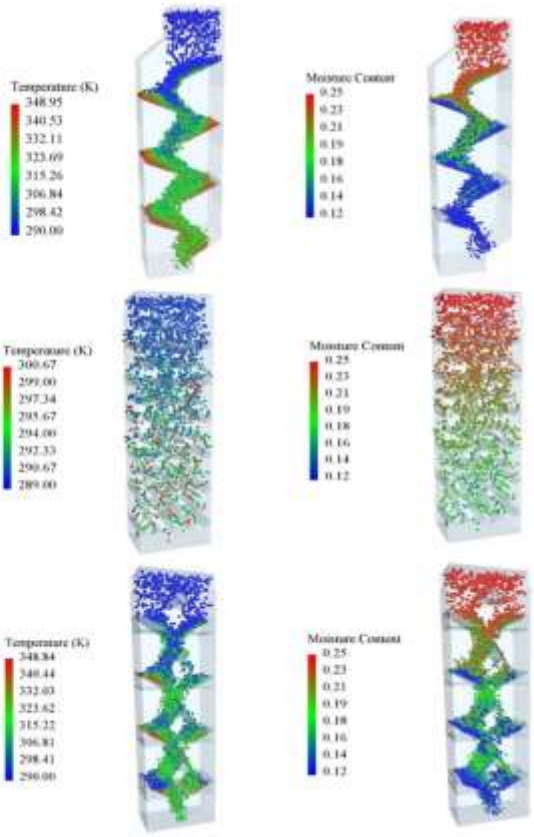
Grain Drying process in a crossflow dryer



(a)

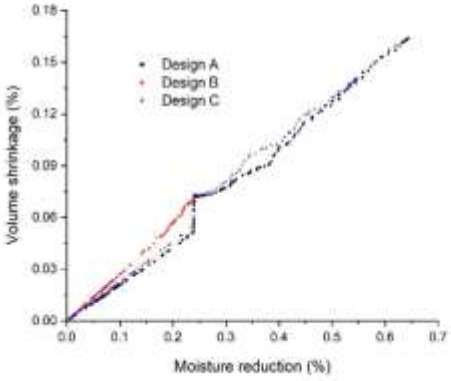


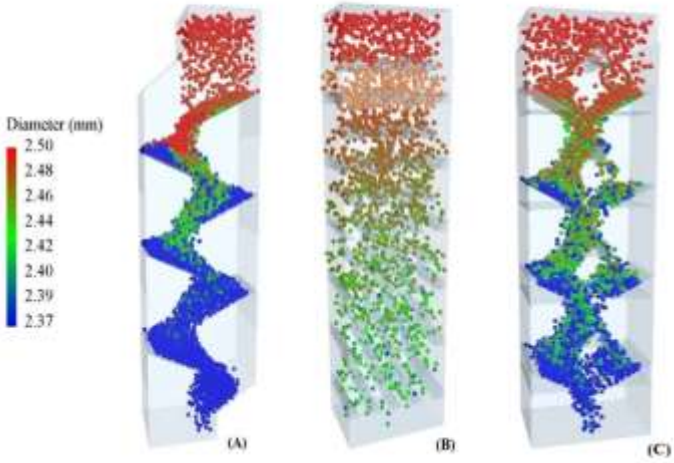
(b)



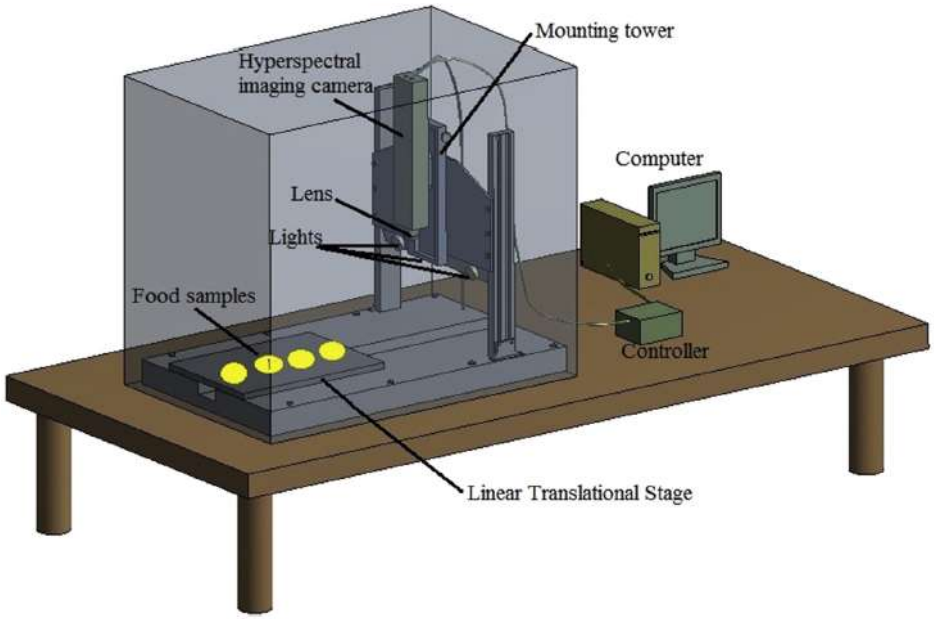
Variation of average particle temperature (a) and average particle moisture content (b) with time for different grain inverters. For all the cases, $T_{p,\,in}$ = 373 K and RH of inlet air 10%, V_{in} = 1 m/s

Particles volume shrinkage

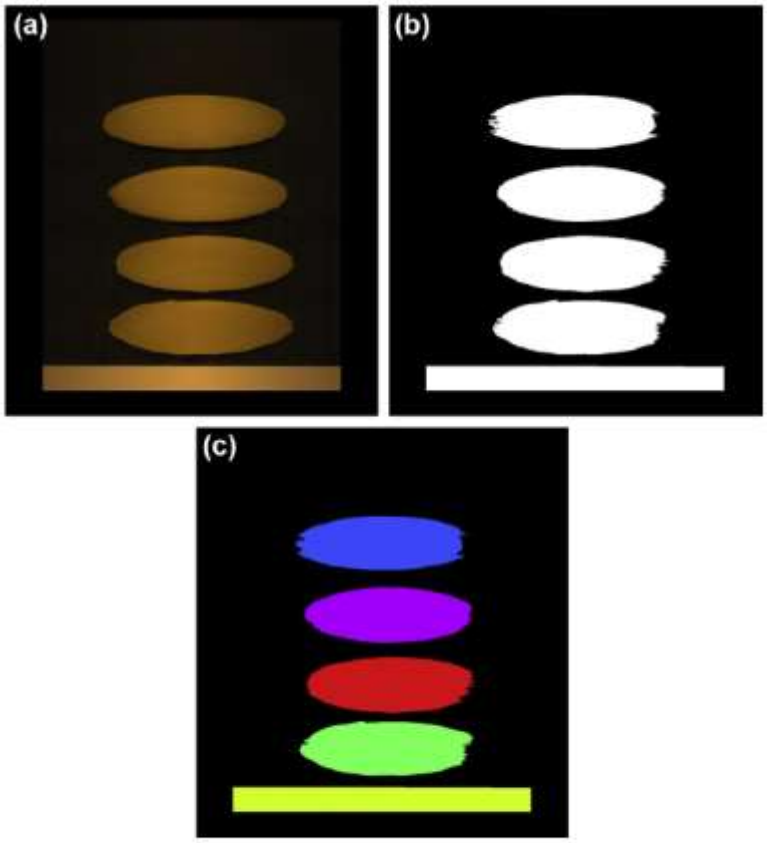




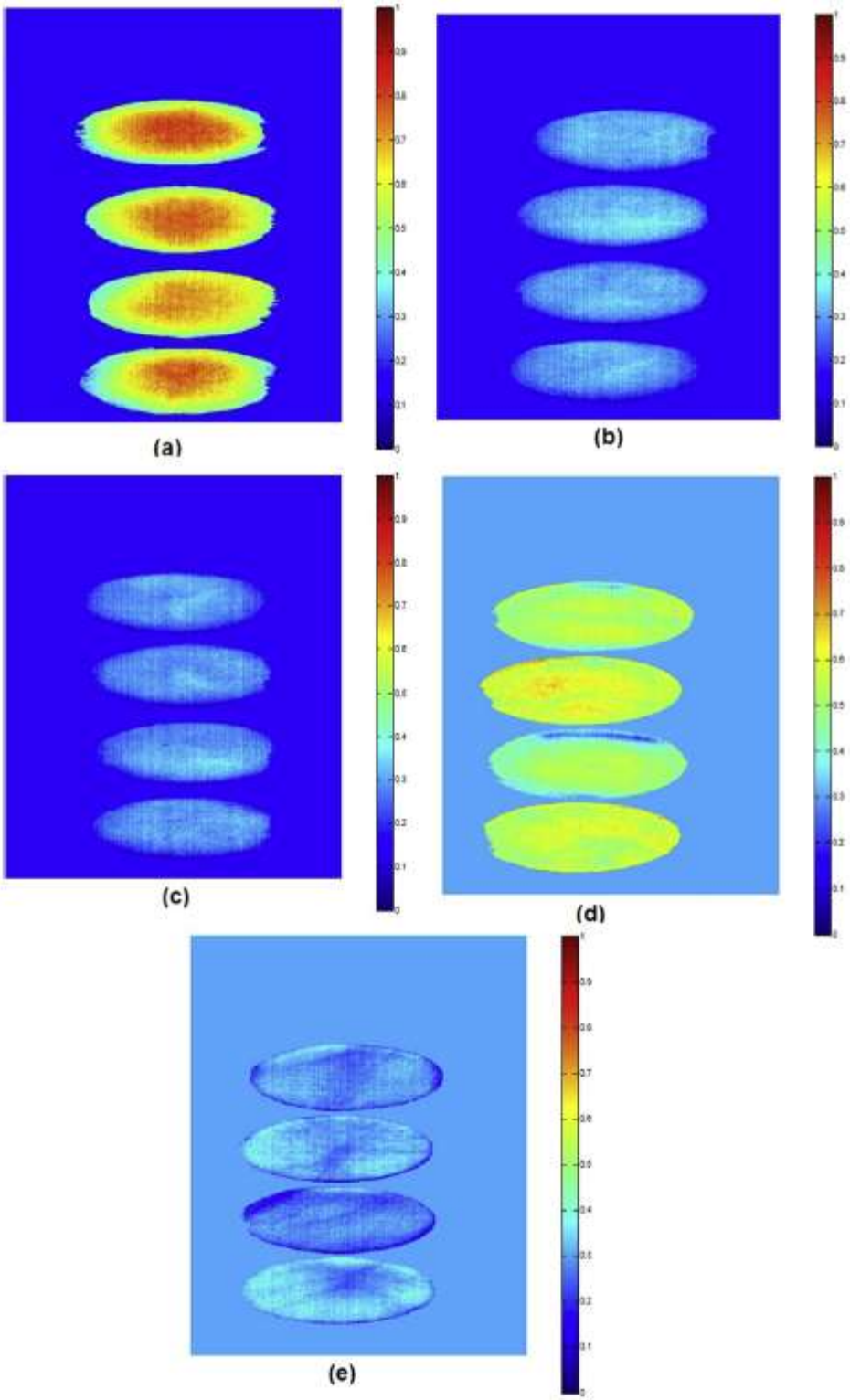
2- Hyperspectral imaging of food during drying process to access real time change in food physical properties, useful to develop control mechanism to optimize drying processes



Schematic representation of hyperspectral system used to test potato samples (slices).



Example of potato slice segmentation during processing, where a) shows the RGB image of the potato, b) the NIR segmented image to detect slices, and c) the detected and numbered slices.



Moisture content distribution map of potato slices generated by using the optimal PLS model for 5 mm potato slices at 50 C (a, b, c), 60 C (d, e, f) and 70 C (g, h, i) for 0, 30 and 60 min.

3- Development of large food dryers to get drying uniformity through uniform air distribution along with application of renewable energy

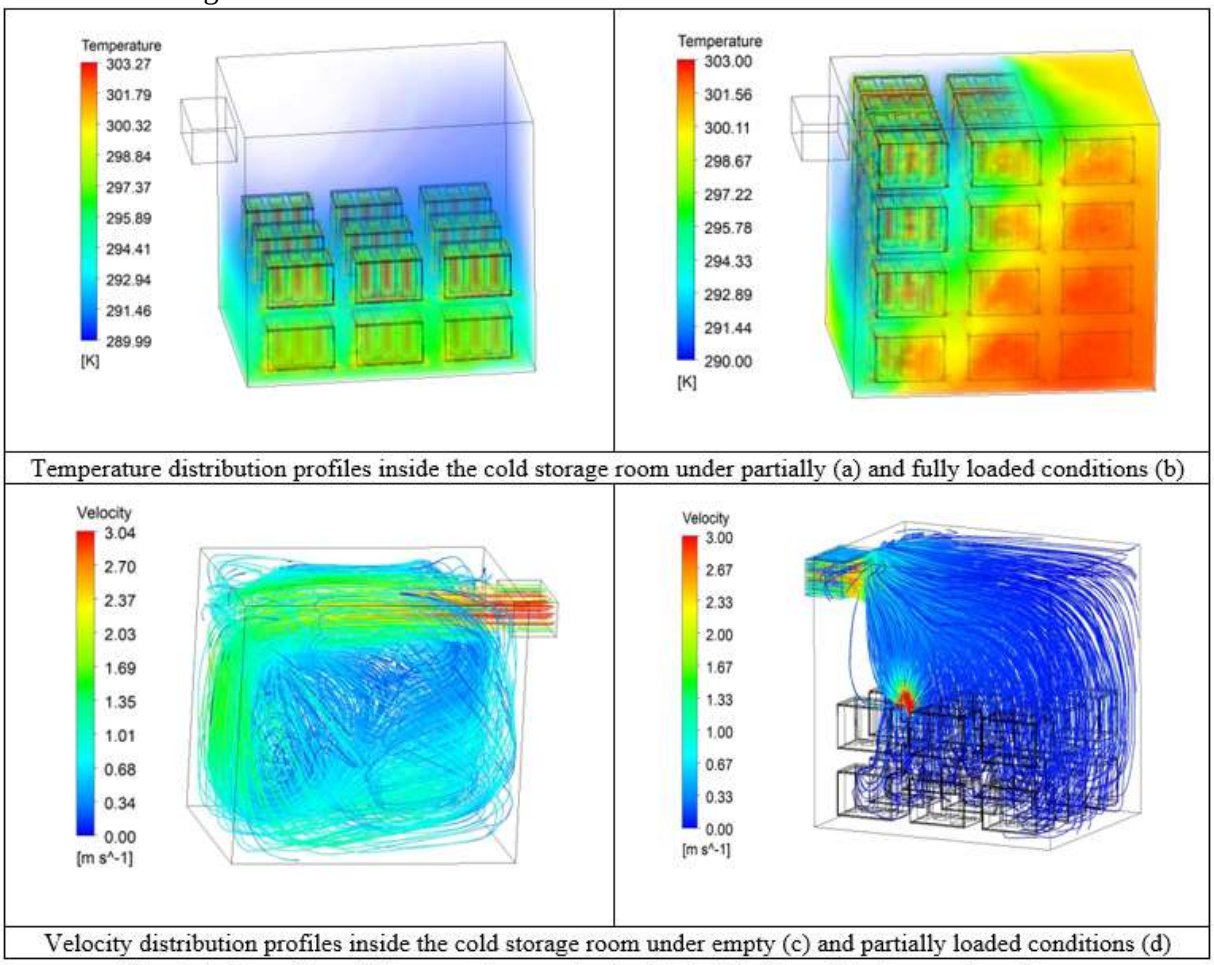
Drying of Turmeric

Drying of seed (maize)

Drying of chili

4- Cold storage facilities to preserve food at production sites

Thermal modelling of stored food

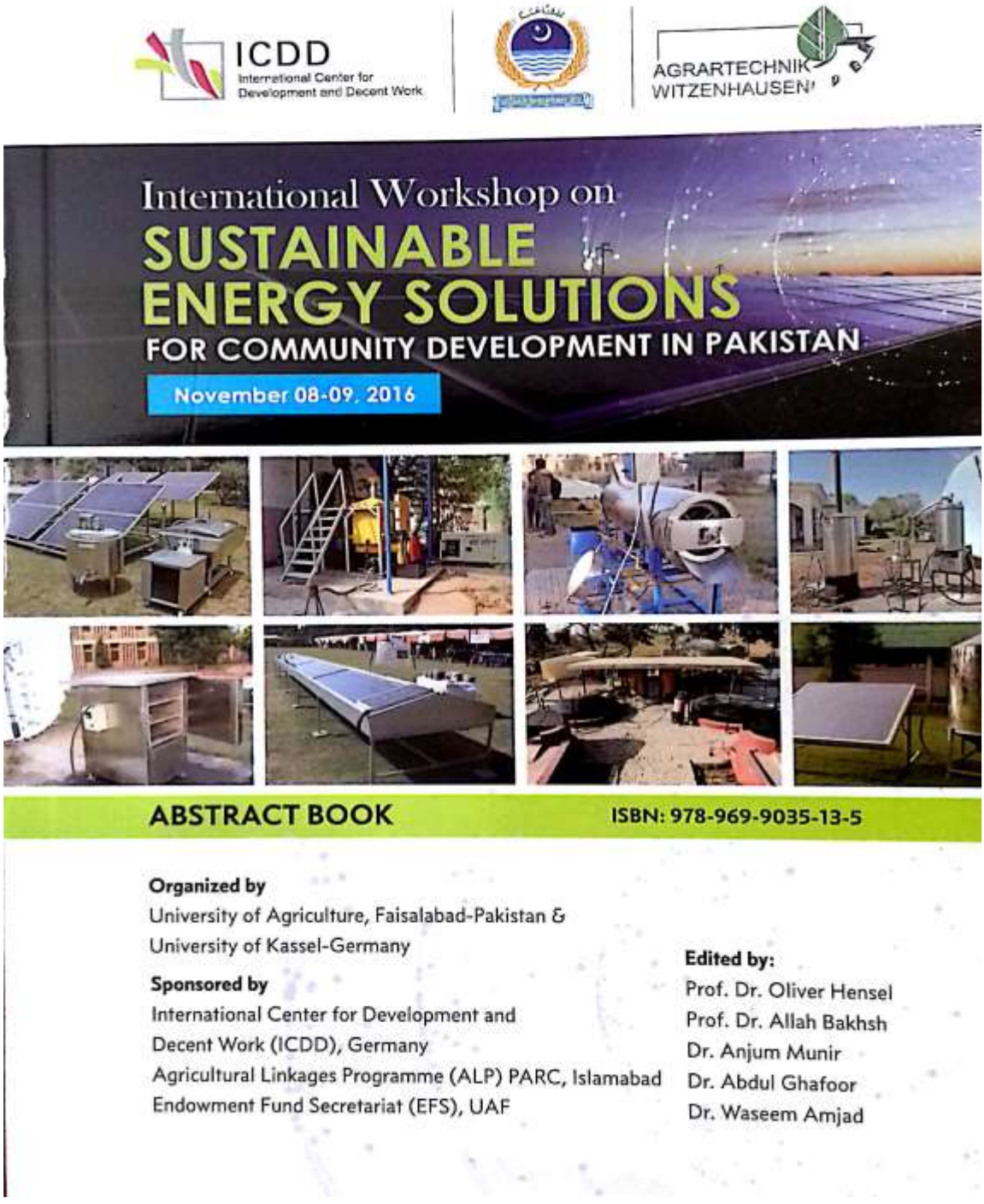


Temperature distribution profiles inside the cold storage room under partially (a) and fully loaded conditions (b)

Velocity distribution profiles inside the cold storage room under empty (c) and partially loaded conditions (d)

Simulated profiles of temperature and velocity inside the cold storage chamber

International workshop organized (focusing on application of renewable energy in food processing innovative techniques to reduce energy cost and making them decentralized)



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