

Teaching Portfolio

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Pedagogical view

The pedagogy is structured around three types of lecturing formats to create a constructive alignment with learning objectives and maximize students active, collaborative and reflective learning. Classical lectures aim to introduce course content and provide necessary theoretical knowledge using an integrative two-fold approach that explores facade domain from a design and engineering perspective. Lab lectures are used to build students' computer skills and expertise through hands-on exercises and problem-solving process. The last type of lectures, project studio focuses on research-based learning for creating students' competencies by engaging them in various forms of quests and discussions. This will allow students to understand various contexts and perspectives on the field, develop their own critical and independent thinking, identify their competitive advantages as well as prepare them to work in collaborative team environments. All three lecture types rely on active teaching and learning methods to effectively reach learning objectives in an engaging way. During the course, students work both on individual and group mini projects. Jigsaw teaching technique is used to build individual problem-solving knowledge and skills as well as competencies needed for the teamwork. The individual and mini project are delivered as posters and presented during an individual and a group revision. For the oral exam, students deliver improved versions of their individual and mini project and discuss project genesis, and reasoning behind design decisions that have led to the final proposal. Focus of the pedagogy is therefore to provide hands on experience and practice-oriented context.

Teaching experience

Facade Design and Engineering

Jakica, N. & Kragh, M.

02/09/2019 → 16/12/2019

Passive Solar Design and Daylighting

Bastien, D. & Jakica, N.

04/02/2019 → ...

2016/2017/2018 - Bachelor and master studios and PhD courses at Politecnico di Milano

2008/2009 - Bachelor and master courses at the University of Novi Sad

2016/ongoing - Master and PhD theses at Politecnico di Milano

Formal pedagogical training

Lecturer Training Programme Winter 2019 Residential 8 – 10 January 2019 Workshop 1: Teaching & Learning; Workshop 2: The role of the teacher; Workshop 3: Constructive alignment; Workshop 4: Feedback; Mini-teach

Active teaching and learning using Flipped Learning

Engaging students in group work and collaborative learning

Developing team-work - e.g. cooperative games, De Bono's Hats, Diagnostic assessment and identifying misconceptions - e.g. Mind mapping, Concept mapping, mini-teaching Sharing perspectives and developing arguments - e.g. Continua, Yes-but-Nobut, Values line

Developing arguments and Socratic questioning - e.g. Philosophy for Children (P4C), Peer learning and managing groups - e.g. Snowball, Jigsaw, Envoy, Margolis Wheel, Implementing changes - e.g. Forum theatre, Bridge Model

Other activities related to teaching and teaching development

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Work Experience

2017/2018 - Environmental And Facade Design Specialist At Henn Gmbh, Berlin Office
2016 - Senior Design Architect At Vittorio Grassi Architect And Partners, Milan Office
2011/2016 - Computational And Bim Design Specialist At Vittorio Grassi Architect And Partners, Milan Office
2009-2010 - Junior Design Architect At Novi Dom, Novi Sad Office

Research outputs

Case Study: TIFAIN Facade

Jakica, N., Monticelli, C. & Zanelli, A., 2023, *Lightweight Energy: Membrane Architecture Exploiting Natural Renewable Resources*. Zanelli, A., Monticelli, C., Jakica, N. & Fan, Z. (eds.). Springer, p. 177-213 (Research for Development).

Lightweight Environmental Architecture

Jakica, N. & Di Bitonto, M. G., 2023, *Lightweight Energy: Membrane Architecture Exploiting Natural Renewable Resources*. Zanelli, A., Monticelli, C., Jakica, N. & Fan, Z. (eds.). Springer, p. 47-92 (Research for Development).

Additive manufacturing in skin systems: trends and future perspectives

Naboni, R. & Jakica, N., 2022, *Rethinking Building Skins: Transformative Technologies and Research Trajectories*. Gasparri, E., Brambilla, A., Lobaccaro, G., Goia, F., Andalaro, A. & Sangiorgio, A. (eds.). Woodhead Publishing, p. 425-451 (Woodhead Publishing Series in Civil and Structural Engineering).

Circular economy in facades

Kragh, M. K. & Jakica, N., 2022, *Rethinking Building Skins: Transformative Technologies and Research Trajectories*. Gasparri, E., Brambilla, A., Lobaccaro, G., Goia, F., Andalaro, A. & Sangiorgio, A. (eds.). Woodhead Publishing, p. 519-539 (Woodhead Publishing Series in Civil and Structural Engineering).

Are We Ready to Evaluate the Smart Readiness of Australian Buildings?

Markoska, E., Sethuvenkatraman, S., Jakica, N. & Lazarova-Molnar, S., 2021, *Sustainability in Energy and Buildings 2020*. Littlewood, J., Howlett, R. J. & Jain, L. C. (eds.). Singapore: Springer, p. 549-559 (Smart Innovation, Systems and Technologies, Vol. 203).

Undulated Shading - Optical Benefits of Undulated Glass Facade Geometries

Jakica, N. & Kragh, M. K., Aug 2020, *Proceedings of the Façade Tectonics 2020, Face Time 2020: Better Buildings through Better Skins*. Los Angeles, USA, Vol. 2. p. 518-526

Assessing self-shading benefits of twisting towers

Jakica, N. & Kragh, M. K., 2020, In: *Journal of Facade Design and Engineering*. 8, 1, p. 115-130

Assessment of Building Intelligence Requirements for Real Time Performance Testing in Smart Buildings

Markoska, E., Jakica, N., Lazarova-Molnar, S. & Kragh, M. K., 1. Aug 2019, *2019 4th International Conference on Smart and Sustainable Technologies (SpliTech)*. Perković, T., Vukojević, K., Rodrigues, J. J. P. C., Nižetić, S., Patrono, L. & Šolić, P. (eds.). IEEE, 6 p.

Activating Optical Behaviour of Cellular Lattices in Glass Sandwich Facades

Jakica, N. & Kragh, M. K., 2019, *Proceedings of the Advanced Building Skins Conference 2019*. Advanced Building Skins GmbH, p. 292-299

Extreme Soft Skins: Multi-layered ETFE for Challenging Environments

Jakica, N. & Zanelli, A., 2019, *Proceedings of the TensiNet Symposium 2019 "Softening the Habitats"*. p. 570-579

Physically Accurate Visual Representation of Advanced Glass Facades

Jakica, N., Kragh, M. K. & Besse, G., 2019, *Proceedings of the Glass Performance Days 2019 "All Eyes on Smarter Glass"*. p. 248-254

State-of-the-Art Review of Solar Design Tools and Methods for Assessing Daylighting and Solar Potential for Building-Integrated Photovoltaics

Jakica, N., Jan 2018, In: Renewable & Sustainable Energy Reviews. 81, Part 1, p. 1296-1328

Performance-Based Architectural Design, Simulation And Optimisation Of Complex Building Integrated Photovoltaics
Jakica, N., 2018, *PhD Yearbook / 2016*. Biscari, P. (ed.). Politecnico di Milano

Innovative Cable Net Curved-Glass Photovoltaic Façade

Jakica, N. & Zanelli, A., 28. Sept 2017, *Proceedings of IASS Annual Symposia, IASS 2017 Hamburg Symposium: Interfaces: Architecture . Engineering . Science*. International Association for Shell and Spatial Structures (IASS), 7 p.

Evaluating a BiPV sun shading system with various software and methods

Lovati, M., Avesani, S. (Member of author group), Jakica, N. (Member of author group) & Moser, D. (Member of author group), 2016, *Proceedings of the 11th Conference on Advanced Building Skins*. Wilen, Switzerland: Advanced Building Skins GmbH

Experimental Validation of Optical Simulation for Complex Building Integrated Photovoltaic System

Jakica, N., Zanelli, A. (Member of author group) & Frontini, F. (Member of author group), 2015, *Proceedings of the 31st European Photovoltaic Solar Energy Conference and Exhibition (EU PVSEC 2015)*. p. 2890-2895

Patent for community design application

Jakica, N. (Inventor) & Zanelli, A. (Inventor), 2015, Patent No. 002824847, 15. Oct 2015

Patent for industrial invention: Application method for building-integrated photovoltaic modules

Jakica, N. (Inventor) & Zanelli, A. (Inventor), 2015, Patent No. 102015000061983, 15. Oct 2015

Dynamic Visualization of Optical and Energy Yield Co-Simulation of New Generation BIPV Envelope in Early Design Phase Using Custom Ray Tracing Algorithm in Python

Jakica, N. & Zanelli, A. (Member of author group), 2014, *Proceedings of the 9th Conference on Advanced Building Skins*. Munich, Germany: Economic Forum, p. 1031-1038

Parametric Design and Optimisation of the ETFE Envelope of the Sports Stadium in Lamezia Terme

Jakica, N., 2013, *Proceedings of the TENSINET Symposium 2013 [RE]THINKING Lightweight Structures*. Istanbul, Turkey: Mimar Sinan Fine Arts University, p. 417-424

Centre for Innovation in Novi Sad - Parametric Design Study

Jakica, N., 2010, *Proceedings of the Junior Scientist Conference 2010*. Vienna, Austria: Vienna University of Technology, p. 349-350

Parametric Modelling: An Approach to Energy Efficient Building Envelopes and their Interaction with Urban Environment.

Jakica, N., 2010, *Proceedings Abstracts of the UK - Ireland Planning Research Conference 2010 - Diversity and Convergence: Planning in a World of Change*. Liverpool University Press

Centar za Inovacije u Novom Sadu - Studija Parametarskog Projektovanja

Jakica, N. & Šidanin, P., 2009, In: *Proceedings of the Faculty of Technical Sciences, Novi Sad*. 24, p. 148-151

Research study of development and reconstruction of Irig central zone

Jakica, N., 2008, *Research study of development and reconstruction of Irig central zone*. Faculty of Technical Sciences, University of Novi Sad, p. 35-38

Stressfree District

Jakica, N., Acmaz, M. & Pazane, T., 2007, *LOCAL IDENTITY AND GLOBALISATION - Final Report of the YTK/IFHP Urban Planning and Design Summer School 2007*. Helsinki University of Technology, Centre for Urban and Regional Studies, p. 100-103 (LOCAL IDENTITY AND GLOBALISATION - Final Report of the YTK/IFHP Urban Planning and Design Summer School 2007).

Geometry of Rectilinear Surfaces, Their Visualization and Application in Creating Architectural forms (In Serbian)
Jakica, N., 2006, *Proceedings of the 23rd Conference on Descriptive Geometry, MoNGeometry 2006*. Faculty of Technical Sciences, University of Novi Sad, p. 16-24