

PORTFOLIO (SCIENTIFIC PROFILE) OF THE HEAD OF THE NIP



Vatin Nikolay Ivanovich, Doctor of Technical Sciences, Professor, Director of Scientific and Technological Complex "Digital Engineering in Civil Engineering"

Education, degree and title

Graduated from the Leningrad Polytechnic Institute in 1977, qualified as an electrical engineer. In 1986 he was awarded the degree of Candidate of Technical Sciences, and in 2001 he was awarded the degree of Doctor of Technical Sciences. In 2012, he was awarded the academic title of Professor.

Work experience

He has been working from 1977 to the present time at Peter the Great St. Petersburg Polytechnic University. Worked in the following positions: engineer, junior researcher, assistant, leading researcher, head of department, professor, head of department, dean, director of institute, professor, chief researcher, director of scientific and technological complex.

Scientific work

Author of more than three hundred scientific papers. Hirsch index according to SCOPUS - 44. Hirsch index according to Web of Science - 33.

Membership and activities in professional associations

Academician of the Russian Academy of Natural Sciences.

Advisor to the Russian Academy of Architecture and Construction Sciences.

Expert activity

Expert of the Russian Science Foundation.

Expert of the corps of experts of the Russian Academy of Sciences.

Expert of the Department of Urban Planning Policy of Moscow. Moscow for expert reviews in the "System of Technology Transfer and Innovation Expertise SITTex".

Expert of the Federal Register of Experts of Scientific and Technical Sphere FGBNU Research Institute RINCSE.

Expert of the National Center for State Scientific and Technical Expertise of the Republic of Kazakhstan.

Links to profiles in scientometric systems (Google Scholar, RSCI, etc.).

Scopus - <https://www.scopus.com/authid/detail.url?authorId=6508103761>

Web of Science - <https://www.researcherid.com/rid/O-6995-2019>

Orcid - <https://orcid.org/0000-0002-1196-8004>

ResearchGate - <https://www.researchgate.net/profile/Nikolai-Vatin>

Topics and content of research and educational activities

1. topics of specific projects (implemented, executed), positions in the NIP (leader, executor), results obtained

1) Grant of the President of the Russian Federation (project NSH - 3792.2018.6). 2018 - 2019 -

Head. The theoretical, methodological and methodological provisions, as well as practical recommendations on the application of a set of innovation management mechanisms at the micro-, meso- and macro-levels of the modern economic system of the Russian Federation are developed.

2) State task of the Ministry of Education "Formation and development of regional innovation systems in the Russian economy". 26.6446.2017/BH. 2017 - 2019 - Head.

Results. The theoretical foundations of management of innovative modernization of the Russian socio-economic system have been developed; the provisions of the concept of formation of innovative environment of the Russian socio-economic system development have been supplemented; modeling of the processes of formation of innovative environment of the Russian socio-economic system has been carried out; methods and models of regional industrial policy have been developed and its efficiency has been evaluated.

3) State assignment of the Ministry of Education 26.1303.2014/K "Theory and tools for the formation of state industrial policy in the conditions of innovation economy" - supervisor. Analyzed the current state and the toolkit of formation of industrial clusters in the Russian economy, presented information support for monitoring of territorial-production cluster, presented the tools of implementation of cluster policy in the region, and reflected the characteristics of the warehouse distribution network of industrial cluster enterprises.

4) CBC INCROBB grant "Inclusive cross-border business networking of tomorrow" 2020 - leader. Based on the research conducted, a digital cross-border inclusive cross-border networking dynamic database for SMEs and unemployed professionals in the region was developed to support these actors in selecting effective teams. In addition to this database, a practical guide to cross-border cooperation in Russian and Finnish has been developed and offered to the SMEs participating in the project.

5) State order "Provision of services on investment packaging of cluster participants' projects for the needs of the Moscow Innovation Cluster Foundation, contract No. 107/8-21 dated 20.09.2021 - head of the working group and activities to fulfill the customer's terms of reference. Investment packaging of 12 innovative projects of cluster participants of the MIC Foundation cluster was carried out.

6) State order for research and development work for LLC MC RUSNANO, contract No. 0912/2021 dated 20.12.2021 - head of activities to fulfill the customer's technical assignment.

7) State task of the Ministry of Education "Development of methodology of formation of instrumental base for analysis and modeling of spatial socio-economic development of systems in the conditions of digitalization with reliance on internal reserves" (FSEG-2023-0008) - Head.

Results (2023).

- The methodological basis for the formation of an instrumental base for ensuring economically safe development of Russian regions under the influence of external and internal destabilizing factors, based on the modeling of the dynamics of human capital reproduction factors in the relationship with the impact of threats to economic security, taking into account the role of digital transformation processes in increasing the level and improving the quality of life of the population, as well as the features of the economic space of the country;
- Methodological bases of organization of monitoring of innovation risks and formation of a set of measures to reduce innovation threats for key subjects of different levels of the national innovation system on the basis of development of risk management tools have been developed
- A set of tools has been developed to ensure sustainable economic development of the nuclear power industry complex taking into account its spatial aspects, the use of which makes it possible to develop solutions for the management of the complex objects taking into account the reduction of the risk of economic losses and assessment of the impact of complex interrelations with the external environment.

2. List of key publications for the last 5 years

1 Vatin, N.I., Hematibahar, M. and Gebre, T.H. (2024) Impact of Basalt Fiber Reinforced

- Concrete in Protected Buildings: A Review. *Frontiers in Built Environment*, 10. <https://doi.org/10.3389/fbuil.2024.1407327>.
- 2 Mouli, K.C., Raghavendran, C. V., Mallikarjuna Rao, C., Ushasree, D., Indupriya, B., Vatin, N.I. and Negi, A.S. (2024) Performance Analysis of Linear and Non-Linear Machine Learning Models for Forecasting Compressive Strength of Concrete. *Cogent Engineering*, 11. <https://doi.org/10.1080/23311916.2024.2368101>.
- 3 Maltseva, T. V., Nabokov, A. V. and Vatin, N. (2024) Consolidation of Water-Saturated Viscoelastic Subgrade. *Magazine of Civil Engineering*, 17. <https://doi.org/10.34910/MCE.125.2>. <https://doi.org/10.34910/MCE.125.2>.
- 4 Ahmad, J., Khan, M.A., Ahmad, S., Mursaleen, M., Alkahtani, M.Q., Vatin, N.I. and Islam, S. (2024) Mechanical and Microstructural Behavior of Sand Treated by Filamentous Fungus Mycelium Mediated Calcite Precipitation. *Journal of Natural Fibers*, 21. <https://doi.org/10.1080/15440478.2024.2390079>.
- 5 Borovkov, A.I., Vafaeva, K.M., Vatin, N.I. and Ponyaeva, I. (2024) Synergistic Integration of Digital Twins and Neural Networks for Advancing Optimization in the Construction Industry: A Comprehensive Review. *Construction Materials and Products*, 7. <https://doi.org/10.58224/2618-7183-2024-7-4-7>. <https://doi.org/10.58224/2618-7183-2024-7-4-7>.
- 6 Rakkini, A.M., Libu, R.S.R., Vatin, N.I., Devanesan, S., Selvankumar, T., Mary Arul Rosaline, L., Amala Infant Joice, J., Dixit, S. and Lo, H.M. (2024) Enhancing Photocatalytic Activity and Biological Applications of TiO₂ Nanoparticles Using Moringa Oleifera Leaf Extract. *Waste and Biomass Valorization*. <https://doi.org/10.1007/s12649-024-02670-6>.
- 7 Chen, W., Fediuk, R., Yu, J., Nikolayevich, K., Vatin, N., Bazarov, D. and Yu, K. (2024) Performance Prediction and Analysis of Engineered Cementitious Composites Based on Machine Learning. *Developments in the Built Environment*, 18. <https://doi.org/10.1016/j.dibe.2024.100459>.
- 8 G. V. V, S., Vivek Kumar, C., R. M, K., A, P., Vatin, N.I., Joshi, A. and Hussein, L. (2024) Machine Learning Prediction and Optimization of Compressive Strength for Blended Concrete by Applying ANN and Genetic Algorithm. *Cogent Engineering*, 11. <https://doi.org/10.1080/23311916.2024.2376914>.
- 9 V, M.R., Lomada, R.R., C, V.K., R, K., Sergei, S., Vatin, N.I. and Joshi, A. (2024) ML Prediction and ANN-PSO Based Optimization for Compressive Strength of Blended Concrete. *Cogent Engineering*, 11. <https://doi.org/10.1080/23311916.2024.2380347>.
- 10 Singh, R., Dogra, S., Dixit, S., Vatin, N.I., Bhardwaj, R., Sundramoorthy, A.K., Perera, H.C.S., Patole, S.P., Mishra, R.K. and Arya, S. (2024) Advances in Thermoelectric Materials for Efficient Waste Heat Recovery and Renewable Energy Generation. *Hybrid Advances*, 5. <https://doi.org/10.1016/j.hybadv.2024.100176>.
- 11 Ayub, S., Guan, B.H., Ahmad, F., Soleimani, H., You, K.Y., Nisa, Z.U. and Vatin, N.I. (2024) Flexible Poly (Vinylidene Fluoride) Composite with Magnetite-Modified Graphene: Electromagnetic Shielding in X-Band. *Heliyon*, 10. <https://doi.org/10.1016/j.heliyon.2024.e39828>.
- 12 Momeni, K., Vatin, N.I., Hematibahar, M. and Gebre, T.H. (2024) Repair Overlays of Modified Polymer Mortar Containing Glass Powder and Composite Fibers-Reinforced Slag: Mechanical Properties, Energy Absorption, and Adhesion to Substrate Concrete. *Frontiers in Built Environment*, 10. <https://doi.org/10.3389/fbuil.2024.1479849>.
- 13 Khan, M., Umar, M., Alam, M., Ali, U., Vatin, N.I. and Almujiabah, H. (2024) Evaluation of Design Parameters for Geosynthetic Reinforced-Soil Integrated Bridge System Based on Finite Element Analysis. *Frontiers in Materials*, 11. <https://doi.org/10.3389/fmats.2024.1454201>.
- 14 Akhazhanov, S.B., Vatin, N.I., Akhmediyev, S., Akhazhanov, T., Khabidolda, O. and Nurgoziyeva, A. (2023) Beam on a Two-Parameter Elastic Foundation: Simplified Finite Element Model. *Magazine of Civil Engineering*, 121. <https://doi.org/10.34910/MCE.121.7>.
- 15 Lukina, A. L., Lisyatnikov, M. L., Lukin, M. L., Vatin, N. and Roshchina, S. R. (2023) Strength Properties of Raw Wood after a Wildfire. *Magazine of Civil Engineering*, 119.

<https://doi.org/10.34910/MCE.119.7>. <https://doi.org/10.34910/MCE.119.7>.

16 Erofeev, V.T., Korotaev, S.A. and Vatin, N.I. (2023) Deformation and Heat-Insulating Characteristics of Light Concrete on Porous Burned Binder Under Heating. *Materials Physics and Mechanics*, 51, 33-41. https://doi.org/10.18149/MPM.5112023_4.

17 Dixit, S., Singh, A., Singh, J., Kumar, R., Vatin, N.I., Kumar, K., Miroshnikova, T., Epifantsev, K. and Sinha, M.K.. (2023) Comparison of Theoretical and Experimental Physio-Mechanical Properties of Coal-Fly Ash (CFA) Reinforced Iron Matrix Composites. *International Journal on Interactive Design and Manufacturing*, 17, 2429-2444. <https://doi.org/10.1007/s12008-022-01022-9>.

18 Akhmediyev, S.K., Khabidolda, O., Vatin, N.I., Yessenbayeva, G.A. and Muratkhan, R. (2023) PHYSICAL AND MECHANICAL STATE OF CANTILEVER TRIANGULAR PLATES. *Journal of Mathematics, Mechanics and Computer Science*, 118, 64-73. <https://doi.org/10.26577/JMMCS.2023.v118.i2.07>.

19 Murali, G., Abid, S.R., Al-Lami, K., Vatin, N.I., Dixit, S. and Fediuk, R. (2023) Pure and Mixed-Mode (I/III) Fracture Toughness of Preplaced Aggregate Fibrous Concrete and Slurry Infiltrated Fibre Concrete and Hybrid Combination Comprising Nano Carbon Tubes. *Construction and Building Materials*, 362, 129696. <https://doi.org/10.1016/j.conbuildmat.2022.129696>.

20 Kenzhegulov, B.Z., Vatin, N.I., Kenzhegulova, C.B., Alibiyev, D.B., Kazhikenova, A.S. and Khabidolda, O. (2023) Numerical Modeling of the Temperature Distribution Field in a Complex Shape Structural Element. *KazNU Bulletin. Mathematics, Mechanics, Computer Science Series, al-Farabi Kazakh State National University*, 120, 69-81. <https://doi.org/10.26577/JMMCS2023v120i4a7>.

21 Sharafutdinov, K.B., Saraykina, K.A., Kashevarova, G.G., Sanyagina, Y.A., Erofeev, V.T. and Vatin, N.I. (2023) STRENGTH AND DURABILITY OF CONCRETES WITH A SUPER ABSORBENT POLYMER ADDITIVE. *International Journal for Computational Civil and Structural Engineering*, 19, 120-135. <https://doi.org/10.22337/2587-9618-2023-19-2-120-135>.

22 Eshmatov, B.K., Abdikarimov, R.A., Amabili, M. and Vatin, N.I. (2023) Nonlinear Vibrations and Dynamic Stability of Viscoelastic Anisotropic Fiber Reinforced Plates. *Magazine of Civil Engineering*, 118. <https://doi.org/10.34910/MCE.118.11>. <https://doi.org/10.34910/MCE.118.11>.

23 Klyuev, A., Kashapov, N., Klyuev, S., Ageeva, M., Fomina, E., Sabitov, L., Nedoseko, I., Vatin, N.I., Kozlov, P. and Vavrenyuk, S. (2023) Alkali-Activated Binders Based on Technogenic Fibrous Waste. *Case Studies in Construction Materials*, 18. <https://doi.org/10.1016/j.cscm.2023.e02202>.

24 Esparham, A., Vatin, N.I., Kharun, M. and Hematibahar, M. (2023) A Study of Modern Eco-Friendly Composite (Geopolymer) Based on Blast Furnace Slag Compared to Conventional Concrete Using the Life Cycle Assessment Approach. *Infrastructures*, 8. <https://doi.org/10.3390/infrastructures8030058>.

25 Jurayev, D.J., Vatin, N., Sultanov, T.Z. and Mirsaidov, M.M. (2023) Spatial Stress-Strain State of Earth Dams. *Magazine of Civil Engineering*, 118. <https://doi.org/10.34910/MCE.118.10>. <https://doi.org/10.34910/MCE.118.10>.

26 Hematibahar, M., Hasanzadeh, A., Vatin, N.I., Kharun, M. and Shooshpasha, I. (2023) Influence of 3D-Printed Reinforcement on the Mechanical and Fracture Characteristics of Ultra High Performance Concrete. *Results in Engineering*, 19. <https://doi.org/10.1016/j.rineng.2023.101365>.

3. Experience of scientific supervision of scientific activities of undergraduate and graduate students

Vatin N.I. prepared 1 Doctor of Sciences and 8 Candidates of Sciences.

For the last 5 years under the direction of Vatin N.I. the following works were defended.

- Ignatyev Alexey Aleksandrovich, Ph.D. Functionally stable road granular mixtures (redesigns) of long-term storage.
- Kotov Evgeny Vladimirovich, PhD. Estimation of parameters of unsteady unpressurized

filtration flow in soil cofferdams and dams.

- Habidolda Omirhan, PhD. Investigation of stress-strain state and strength assessment of elements of building structures taking into account crack-like defects.
- Sabri Mohamad Muayad Sabri, Ph.D. Reinforcement of foundations and settlement control of buildings with expandable polyurethane resin.