

## Requests for Collaboration

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<p><b>Research Interests</b></p> <ul style="list-style-type: none"> <li>● Tropical cyclone, storm surge, meteo-tsunami and climate change</li> <li>● Flow inside and around porous media</li> <li>● Image analysis for civil engineering</li> <li>● Mass transfer in coastal processes</li> </ul>	
<p><b>Creative Achievements in The Application of New and Existing Science and Technology</b></p> <p>(1) Measurement and modeling of turbulence in porous media; Direct measurement of the flow is difficult. We used PIV technique with Refractive Index Matching method to measure velocity field inside and around porous media. Turbulent properties such as Reynolds stress were calculated and we investigated the relation between them and mean flow properties. (2) Development of Image Velocimetry; We are developing new path-line PIV algorithm combined with stereo-photography technique. (3) Numerical simulation for fluid motion with complex geometry; Tortuous flow passages in porous media are difficult to express in numerical simulation. IB method is useful for expressing complex solid wall in finite difference method with simple Cartesian coordinate system. We developed three-dimensional IB method and validated its accuracy for analysis of porous media flow. (4) Risk assessment of storm surge; Our knowledge of tropical cyclone (TC) system is still limited whereas damage risk is large. The major problem is absolute lack of observational data of TC. To overcome this problem, we developed the stochastic downscaling method which can generate numerous artificial TC data. And its result was applied to storm surge risk assessment.</p>	
<p><b>Technology (Product, Process, Device, Service etc.) That I Want to Request for Collaboration</b></p> <ul style="list-style-type: none"> <li>● Risk assessment of coastal and river disaster; ex. tropical cyclone disaster and storm surge</li> <li>● Simulation of flow in complex geometry media and evaluation of mass transfer and fluid forces</li> <li>● Development of particle image velocimetry system</li> <li>● Improvement of risk communication about disaster information</li> </ul>	
<p><b>A List of 5 Key Publications</b></p> <ul style="list-style-type: none"> <li>• Basic study on real-time prediction of meteotsunami using artificial neural network model calibrated by stationary measurement data, <u>S. Nakajo</u>, R. Yamaguchi, S. Kim, G. Tsujimoto, <i>Proceedings of APAC 2017</i>, pp. 292-301 (2017).</li> <li>• The future prediction of the one-dimensional topography of the estuary delta of the Shirakawa River, <u>S. Nakajo</u>, K. Nakanishi and H. Ota, <i>Coastal Engineering Journal</i>, <b>59</b>, No. 2, 1740008 (24 pages) (2017).</li> <li>• On the effects of absence of a member of porous media based on microscopic flow simulation, <u>S. Nakajo</u>, Y. Watanabe and T. Shigematsu, <i>J. JSCE, Ser. B2 (Coastal Engineering)</i>, <b>73</b>, No.2, I_877-I_882 (2017) (Japanese).</li> <li>• Global Stochastic Tropical Cyclone Model based on principal component analysis and cluster analysis, <u>S. Nakajo</u>, N. Mori, T. Yasuda and H. Mase, <i>Journal of Applied Meteorology and Climatology</i>, <b>53</b>, 1547-1577 (2014).</li> <li>• Experimental verification of turbulence modeling for the flow through a porous media using PTV, <u>S. Nakajo</u> and T. Shigematsu, <i>Proceedings of 7th International Symposium on Turbulence and Shear Flow Phenomena</i>, CD-ROM, P37P (2011).</li> </ul>	