


## Requests for Collaboration

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<p><b>Research Interests</b></p> <ul style="list-style-type: none"><li>● Materials processing using plasma</li><li>● Plasma in contact with multi-phase media</li><li>● Modeling and simulation</li></ul>	
<p><b>Creative Achievements in The Application of New and Existing Science and Technology</b></p> <p>(1) We obtained a free-standing membrane with embedded nanoparticles by irradiating dielectric barrier discharge plasma on an aqueous solution containing H<sub>Au</sub>Cl<sub>4</sub> and gelatin. Size regulation may be achieved because nanoparticles are quickly captured by the growing membrane before they coagulate.</p> <p>(2) We developed a novel three-dimensionally integrated micro solution plasma reactor (3D IMSP), which can generate a large number of microplasmas in a porous dielectric material filled with a gas/liquid mixed medium. 3D IMSP may be applied to large volume water treatments.</p> <p>(3) We utilized propagation of "plasma bullets" to hydrophilic treatment of inner surfaces of a bone-regeneration scaffold. Acceleration of bone regeneration may be achieved by this treatment.</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>● Microfluidics</li><li>● Cell Biology or Cell Membrane Engineering</li><li>● Electrochemistry</li><li>● Tissue regeneration using scaffolds</li></ul>	
<p><b>A List of 5 Key Publications</b></p> <ul style="list-style-type: none"><li>• <u>T. Shirafuji</u> and Y. Sawada: Effects of ambient air on the characteristics of an atmospheric-pressure plasma jet of a gas mixture of highly N<sub>2</sub>-diluted O<sub>2</sub> on a sliding substrate, <i>Jpn. J. Appl. Phys.</i> <b>57</b>, 01AA06 (10pp) (2018). DOI 10.7567/JJAP.57.01AA0</li><li>• <u>T. Shirafuji</u>, Y. Nakamura, S. Azuma, N. Sotoda, and T. Isshiki: Au-nanoparticle-embedded cross-linked gelatin films synthesized on aqueous solution in contact with dielectric barrier discharge, <i>Jpn. J. Appl. Phys.</i> <b>57</b>, 0102BE (8pp) (2018). DOI 10.7567/JJAP.57.0102BE</li><li>• <u>T. Shirafuji</u>, M. Iwamura, R. Taga, Y. Kashiwagi, K. Nakajima, Y. Ogata, K. Tanaka, A. Tachibana, and T. Tanabe: Acquisition of cell-adhesion capability of the surface of crosslinked albumin films irradiated with atmospheric-pressure plasma jets, <i>Jpn. J. Appl. Phys.</i> <b>55</b>, 07LG03 (5pp) (2016). DOI 10.7567/JJAP.55.07LG03</li><li>• <u>T. Shirafuji</u>, A. Nakamura and F. Tochikubo: Numerical simulation of electric double layer in contact with dielectric barrier discharge -Effects of ion transport parameters in liquid -, <i>Jpn. J. Appl. Phys.</i> <b>53</b>, 03DG04 (6pp) (2014). DOI: 10.7567/JJAP.53.03DG04</li><li>• <u>T. Shirafuji</u>, A. Nomura and Y. Himeno: Three-dimensionally integrated micro solution plasmas: Numerical feasibility study and practical applications, <i>Plasma Chem. Plasma Process.</i> <b>34</b>, 523-534 (2014). DOI: 10.1007/s11090-014-9544-2</li></ul>	