**Plasmonic toolbox for biomedical sensing**

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In this presentation, our efforts in developing a complete plasmonic toolbox (nanomaterials, surface chemistry, spectroscopy and instrumentation) validation will be discussed in the context of clinical and biomedical sensing. In our research, we have studied and integrated novel plasmonic nanomaterials based on nanoparticle and hole arrays, surface chemistry relying on peptide monolayers competent for working in biofluids and unique instrumental designs for sensing biomolecules of importance in disease detection, monitoring the course of treatment of patients during ongoing therapies or of general interest in biological systems. The toolbox we developed was applied to sensing a series of biomolecules including proteins (PSA and antibodies), hormones (testosterone), pheromones and therapeutic drugs (antibiotics and chemotherapy agents). The novel concept of opto-physiology using plasmonic nanosensors based on patch clamp nanopipettes will be demonstrated for monitoring live cell secretion events. Due to the absence of general techniques for detecting metabolites near live cells, developing tool to monitor cell secretion events remains a challenge to overcome in chemical analysis. The plasmonic nanosensor we develop is based on dynamic SERS measurements with single molecule sensitivity in the liquid environment near cells. The first measurement of cell secretion events with a SERS nanosensor will be demonstrated with the detection of small metabolites near live MDCKII cells.

Website: [www.sprbiosensors.com](http://www.sprbiosensors.com)

**Brief Biography:**

Jean-François Masson is an Associate professor of Chemistry at the Université de Montréal. He is a graduate of Arizona State University (PhD) and Georgia Tech (postdoc). His expertise encompasses biosensing with plasmonic materials, instrument development, surface chemistry to minimize biofouling and detection of proteins and drugs directly in crude biofluids. He has published more than 70 research articles and his research has led to filing 9 patents on diverse instrumental, materials or surface chemistry innovations for biosensing. He is the founder and president of Affinité biosensing, a start-up company commercializing SPR instrumentation. Jean-Francois received several awards including the Tomas Hirschfeld award (2005), a NSERC discovery accelerator (2011), the Fred Beamish award of the Canadian Society for Chemistry (2013), and an Alexander von Humboldt fellowship, Germany, (2013-2014) for research at the Max-Planck Institute. He is currently an Associate Editor for the Analyst of RSC publishing. He also serves on several international boards, including for the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), the conference SciX, and on the Executive committee of the Analytical division of the Canadian Society of Chemistry.

**Brief research overview:**

His research interest is in the area of integrative biosensing with plasmonic technologies for providing tools to the healthcare industry for the rapid assessment on the health status of individuals and for remote sensing in the environment. They are exploring several aspects of biosensors for sensing of complex samples such as biofluids. In particular, they explore novel surface chemistries and fluidic design to minimize the impact of biofluids on surface plasmon resonance sensors. They also study plasmonic materials based on hole arrays for enhanced sensitivity and for refractometric measurement multiplexed to surface-enhanced spectroscopies. Their innovations are integrated in instrumentation for portable sensing using surface plasmons and for multiplexed plasmonic sensing. They apply these sensors for therapeutic drug monitoring, biomarker detection and for sensing of environmental contaminants directly in crude fluids.