Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Diffusion-limited and pressure-driven electrodeposition in a microfluidic channel[1] GEOFF STEEVES, University of Victoria, ALEX WLASENKO, DENNIS ZAKOPCAN, DAVID SINTON, University of Victoria —
Self-terminating electrochemical fabrication has previously been devised to create quantum point contacts with single-atom contacts, but the structure of the growth has been poorly controlled. We have introduced a microfluidic channel with which to apply pressure-driven flow during the formation of the junction between two Au electrodes. Without applied flow, dendritic growth and dense branching morphologies were typically observed at the cathode. The addition of applied pressure-driven flow resulted in a densely packed gold structure that filled the channel. Our computer simulation yielded insight into the regimes where the diffusion, flow and electric field between the electrodes individually dominated growth. Proposals for further sophistication in both experiment and simulation will also be presented.

[1]This project is supported by CFI, BCKDF, NSERC and CAMTEC.

Geoff Steeves
University of Victoria

Date submitted: 27 Nov 2007 Electronic form version 1.4