One dimensional metallic systems are predicted to show exotic physics like spin-charge separation. One way to experimentally access such systems is by self-assembling growth of metallic atoms into nanowires on semiconductor substrates. In this project, highly ordered germanium surfaces were prepared and used as a template for the generation of well-separated gold nanowires with lengths exceeding 100nm. Germanium surfaces were cleaned by argon bombardment and flash annealing in ultra-high vacuum before gold was evaporated on these surfaces. Surface reconstructions were observed before and after gold deposition via low energy electron diffraction (LEED). Angle resolved photoemission spectroscopy (ARPES) was chosen as a direct way to measure the electronic band structure of these surface structures. We are the first to perform ARPES investigations of gold nanowires grown on a germanium surface which is unique for its single-domain wire growth mode. Lab-based ARPES data from highly ordered single-domain germanium surfaces revealed gold-induced umklapp-related features in the electronic band structure. These features match the LEED findings that indicated a shortening of the surface Brillouin zone in one direction. A set of both single- and dual-domain nanowire samples was transported in an ultrahigh-vacuum container to the BESSY-II synchrotron in Berlin. Both single- and dual-domain samples were used for photon energy dependent ARPES investigations (20eV<h_<120eV). This was the first successful transfer of nanowire samples from the Amsterdam lab to the synchrotron. The ARPES data showed that the observed features in the electronic structure for single- and dual-domain samples were dispersive in $k_z$, revealing their bulk electronic character. A subsequent scanning tunneling microscopy (STM) study carried out at the University of Twente on the same samples [1] indicated that a heat treatment process was necessary - after the transport from one lab to the next - to remove an absorbate layer that masked the nanowire structures. Therefore the lack of clearly nanowire related ARPES signals reported here, plus the STM data after annealing, point to the necessity of further surface treatment to remove adsorbate overlayers prior to future ARPES experiments.