With increasing concern over issues such as climate change and food scarcity, it is imperative to find alternatives to fossil fuels, without infringing on land that could be used for food crops. The oil seed crop *Camelina sativa* can be grown in rotation with other food crops, and itself produces an oil viable both for cooking and biofuel applications. The limiting key regulatory step for fatty acid synthesis is the conversion of acetyl-CoA into malonyl-CoA catalyzed by the enzyme Acetyl-CoA Carboxylase (ACCase). Recently a family of proteins, known as Biotin Attachment Domain Containing (BADC), have been observed to co-purify with ACCase and are hypothesized to play a regulatory role in fatty acid synthesis. Based on successful studies in Arabidopsis, this project aims to engineer higher seed oil in Camelina by **1)** over producing a limiting subunit of ACCase, α-carboxyl transferase (α-CT), and **2)** deregulating the effects of BADC inhibition using RNA-interference (RNAi) technology. Recently established lines containing the α-CT over-expressing or BADC RNAi genes are being analyzed to determine the mRNA transcript levels, and seed oil content. In the next phase, the recently developed ribosomal RNA sequencing technique will be used to further our understanding of the global effects of oil engineering on proteins in the plant. With this project we may one-day see *Camelina* being grown in crop rotations as an alternative fuel source.