

## Chapter 8

### **Conclusion**

This thesis demonstrates several aspects of coherent control of the well defined lithium dimer using ultrafast lasers and pulse shaping. Primary experimental results include a demonstration of feedback mediated control of photoionization of  $\text{Li}_2$  using an evolutionary algorithm. Lessons learned by using the evolutionary algorithm were used to control both the transient amplitudes of contributing wavefunctions in a two-state wave packet. The effects of resonant and nonresonant wavelengths have also been elucidated. Further study into strong-field dynamics were also performed, showing that as the field strength increases, the complexity of the produced wave packets increases as the driving electric field increases. Finally, the possibilities for creating electronic wave packets in lithium dimer were studied, with some electronic wave packets observed.