



1st NASA/JPL WORKSHOP ON
BIOMORPHIC EXPLORERS FOR FUTURE MISSIONS

August 19-20, 1998
Jet Propulsion Laboratory
Von Karman Auditorium

SPECIAL EVENING TALK

**"Evolution of Solutions:
Natural & Technological"**

Paul B. MacCready
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The Evolution of Solutions Natural and Technological

Paul B. MacCready, AeroVironment Inc.

In the modern flight realm of supersonic fighters and huge, fast airliners, designers learn little from natural fliers. However, in the wide realm of natural flight (spanning weights larger than 100 kg to smaller than 10^{-10} kg) wherein remarkably versatile and efficient fliers have evolved, nature is far ahead of existing technology - especially in active control, navigation, tiny efficient power systems, low Reynolds Number aerodynamics, system design, and inexpensive replication. Designers of small flight vehicles can learn much from the natural role models, and also can adapt genetic evolutionary procedures for quickly optimizing system design to achieve the chosen, goal. Some general implications are explored for autonomous micro vehicles.