

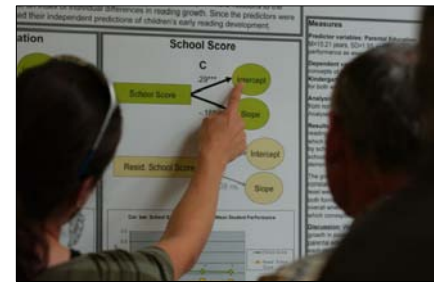


# Institute for Behavioral Genetics

## University of Colorado Boulder



### The Institute



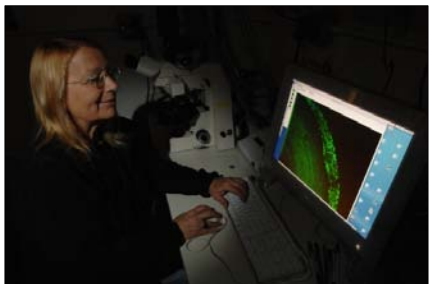
#### Mission

Founded in 1967, the Institute for Behavioral Genetics (IBG) conducts research which examines the genetic bases of individual differences in behavior and provides research training in this interdisciplinary area.

#### Research



IBG is one of the top facilities in the world for genetic research on behavior. Data collection and analysis are ongoing for several internationally renowned studies including the Colorado Adoption Project, the Colorado Twin Registry, the National Youth Survey Family Study, the Colorado Learning Disabilities Research Center, and the National Longitudinal Study of Adolescent Health. IBG is home to one of the nation's largest DNA repositories for research on human behavior, as well as housing a wide array of behaviorally and genetically defined lines of selected, recombinant inbred, transgenic, and knockout-gene mice.



Throughout its history IBG has been characterized by the breadth of its interdisciplinary research and training programs. Although the methodology of behavioral genetics is generally applicable to the study of individual differences for any characteristic, research at IBG is focused on behaviors of societal relevance.

Current research includes studies of aging, neurodegenerative disease, psychopathology, reading and learning disabilities, cognition, substance abuse, behavioral development, and evolution.



#### Training

IBG trains graduate students in the study of genetic influences on behavior. This is accomplished by requiring students to obtain a strong training in a primary academic discipline, by instructing them in the interdisciplinary content of behavioral genetics, and by providing an atmosphere that fosters interactions among scholars from different disciplines.



We direct three NIH pre- and postdoctoral training grants (from the National Institutes of: Mental Health; Child Health and Human Development; and Drug Abuse) supporting 13 graduate students and 4 postdoctoral fellows, and we co-direct another training grant supporting 8 postdoctoral fellows from the National Institute on Alcoholism and Alcohol Abuse.

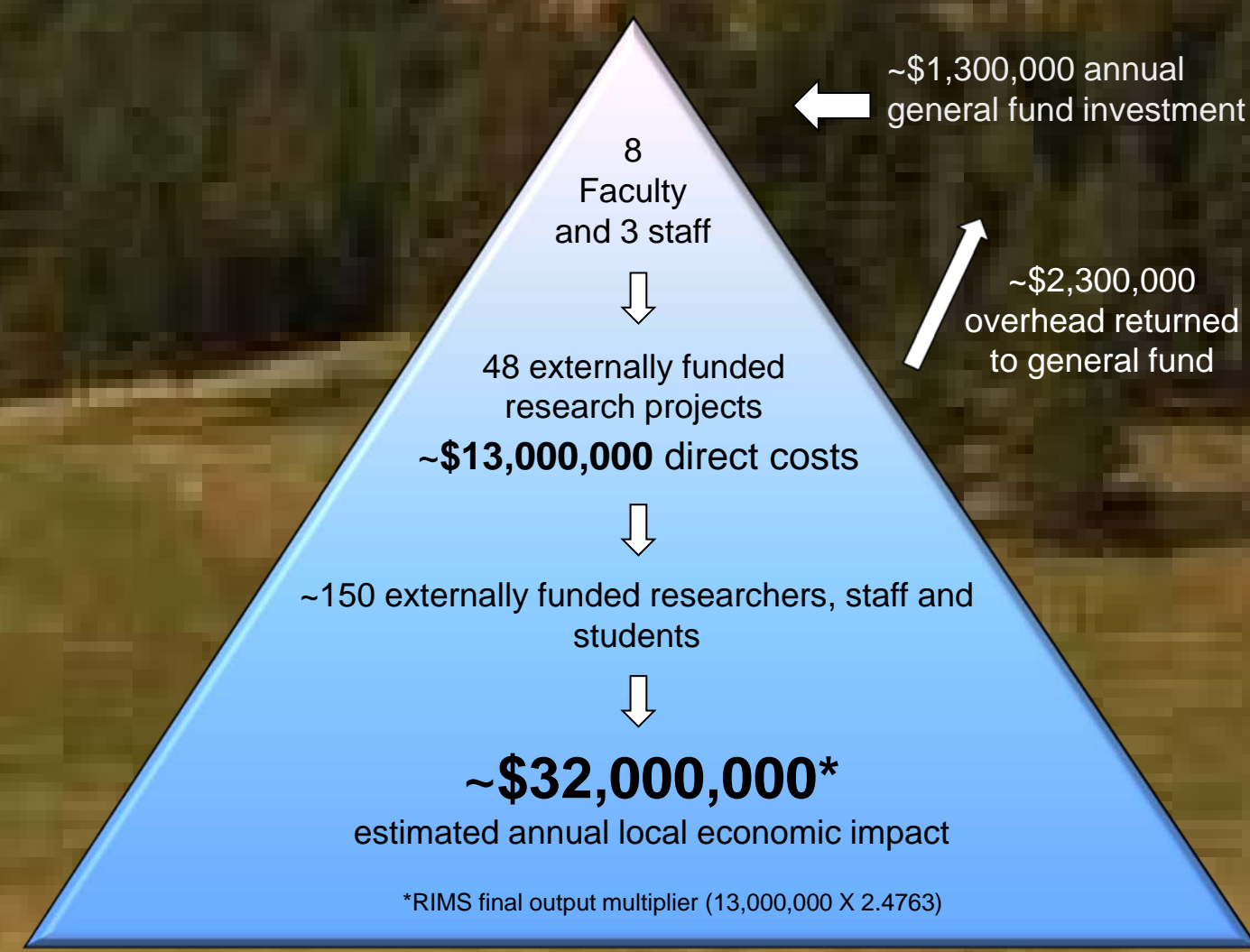
### Societal Impact



### Scientific Impact

- 50+ peer reviewed scientific papers annually
- 12 papers published in *Science* by current IBG faculty
- Full Profs (3) cited more than 500 times each in 2010
- Two major NIH funded research centers: The Learning Disabilities Research Center (P50HD027802) and the Center on Antisocial Drug Dependence (P60DA011015).
- Major contributions to the molecular biology of nicotinic receptors, genetics of reading disability, genetic epidemiology of drug and alcohol abuse, identification of genes controlling lifespan and neurodegenerative disease, and genetic influences on behavioral development.

### Fiscal Impact



### Research Highlights

**Reading Disability:** demonstrated the genetic influence on reading difficulties (DeFries et al., 1987, *Nature*, 329: 537-539) and identified a locus on chromosome 6p which contributes to this genetic risk (Cardon et al, 1994, *Science*, 266: 267-269; Fisher & DeFries, 2002, *Nature Reviews Neuroscience*, 3, 767-780).

**Aging:** discovered a mutation, *age-1*, that results in a two-fold increase in the life span of the nematode, *C. elegans*, a model organism for biological research (Johnson TE, *Science*, 1990, 249: 908-912). Developed the only existing method for predicting subsequent life span (Rea et al., 2005, *Nature Genetics*, 37:894-898).

**Nicotinic receptors:** characterized the molecular biology of nicotinic receptors and the behavioral consequences of their genetic variation in animal models, and demonstrated that activation of one of these receptors is important in the development of nicotine dependence (Tapper et al, 2004, *Science*, 306: 1029-1032). Genetic variation in these nicotinic receptors has been associated with drug seeking behaviors in our human study populations (Schlaepfer et al, 2008. *Current Drug Abuse Reviews*, 1:124-134).

**Risky behavior:** described a heritable trait, behavioral disinhibition, that predisposes individuals to a range of risky behaviors such as substance use and abuse, conduct problems, and impulsive behavior (Young et al, 2009, *Journal of Abnormal Psychology*, 102:78-87). Ongoing twin, adoption, and family studies include brain imaging and genome wide association studies to locate specific brain regions and genes associated with behavioral disinhibition.

**Personality:** identified chromosomal loci influencing anxiety in a mouse model of neuroticism (Flint et al, 1995, *Science*, 269: 1432-1435).

**Cognition:** demonstrated that executive cognitive control, associated with frontal cortical function, is genetically influenced independently of general intelligence (Friedman et al, 2008, *Journal of Experimental Psychology: General*, 137: 201-225).

### Faculty, Researchers & Students

There are 8 tenured or tenure-track faculty rostered in the Graduate School and based at IBG. In total there are 32 Faculty Fellows, most of whom hold joint appointments in academic units on the Boulder and Denver campuses. Although Behavioral Genetics can be thought of as the intersection between genetics and the behavioral sciences, our faculty comes from a broader range of backgrounds.

On the Boulder campus: Dept of Psychology & Neuroscience (10 +3 emeritus), Dept of Ecology & Evolutionary Biology (2), MCDB (1), Dept of Integrative Physiology (4), Dept of Sociology (1), Graduate School (2)

At the University of Colorado Denver: Departments of Pharmaceutical Sciences (2), Pharmacology (3), and Psychiatry (2), and the Center for Bioethics and Humanities (1). At the University of Denver: Department of Psychology (1).

In addition to our research mission, faculty on the Boulder campus participate in both undergraduate and graduate teaching.

Currently, 21 graduate students mentored by IBG faculty fellows participate in the IBG training program; since we are not a degree-granting institute, all current graduate students are affiliated with academic units on the Boulder campus.

Approximately 32 postdoctoral fellows, research associates, and senior research associates are employed at IBG.

Approximately 58 PRAs, 13 administrative and animal laboratory staff members and 31 undergraduate student employees work on our various research projects.