

## Ue-Li Pen

Professor and Interim Director, Canadian Institute for Theoretical Astrophysics  
60 St George St, Toronto, M5S 3H8, Canada  
e-mail: pen@cita.utoronto.ca

### Education/Training

PhD: Princeton 1995

MSc: NCTU, Taiwan, 1991

BSc: NTU, Taiwan, 1989

### Employment/Affiliations

Interim Director, CITA

Associate, Dunlap Institute

Senior Fellow, CIFAR C&G programme

Consultant for Perimeter Institute

### Research Funding (current)

#### 1. As Principal Investigator

Project Title	Type of Grant	Granting Agency	Date of Grant	Total Amount
21m cosmology	Operating	NSERC	Apr 1, 2013 - Mar 31, 2018	160,000
CIFAR partial salary support	Distinguished Scientist Special Award	CIFAR	Jul 1, 2011 - Jun 30, 2017	130,000
Real Time Radio Monitoring Using High Gain Dishes	Operating Contract	OCE, NERC	Nov 1, 2014 - Oct 31, 2016	90,000
SOSCIP Astronomical Data Mining	Operating Contract	OCE	Dec 1, 2014 - Nov 30, 2016	65,000
Canadian VLBI	Operating +Infrastructure	CFI	May 9, 2016 - May 31, 2021	520,000
Virtualized Radio--VLBI digital media	Operating Grant	OCE, NSERC, Thoth Technology Inc.	July 9, 2016 - July 8, 2018	255,000
Optimization of astrophysical simulation performance	Operating Contract	OCE, NSERC	Mar 1, 2017 - Mar 1, 2018	50,000

CHIME	Infrastructure	CFI/UBC	Oct 25, 2013 - Mar 31, 2018	2,600,000
Global holographic VLBI capability for ARO	Operating Contract, CRD	Thoth Technology Inc., NSERC	July 9, 2013 - Sept 13, 2016	354,595
Agile Real Time Radio Signal Processing	PDF support	SOSCIP/Fe dDev	Oct 2015 - Sep 2017	100,000
CITA	Operating	NSERC	Apr, 2016 - Mar, 2021	5,500,000
<b><u>TOTAL AMOUNT (PI)</u></b>				<b><u>9,824,595.00</u></b>

**2. As a Co-Investigator:**

<b>Project Title</b>	<b>Type of Grant</b>	<b>Granting Agency</b>	<b>Date of Grant</b>	<b>Total Amount</b>
CHIME-FRB, IOF, Other	Infrastructure, Operating	CFI	2013 - 2023	11,189,157.00
(CAASTRO)	Centre of Excellence	ARC	April 2011 - March 2018	20,600,000.00 (A\$)
<b><u>TOTAL AMOUNT (Co-I)</u></b>				<b><u>31,789,157.00</u></b>

**Most Significant Contributions** (past five years):

21cm cosmology: A series of over 26 papers since 2006 with over 1368 citations, a field where I am internationally recognized leader. A representative example with concrete 21cm auto-correlation constraints: Switzer, E. R., Pen, U.L., et al. (2013). Determination of  $z \sim 0.8$  neutral hydrogen fluctuations using the 21 cm intensity mapping autocorrelation. *MNRAS*, 434(1), L46-L50.

Fast Radio Bursts: Since entering this new field in 2015, over 7 papers with over 213 citations. The first of the series is: Masui, K., Lin, H., Pen, U.L., et al. (2015). Dense magnetized plasma associated with a fast radio burst. *Nature*, 528(7583), 523-525G.

Pulsar measurements of fundamental physics: The new field of pulsar scintillometry created by me in 2012 pioneers the new concept of using the interstellar plasma as a giant telescope to achieve picoarcsecond precision. 15 papers, mostly in the last year, are starting to receive attention, with a preliminary 83 citations. A representative example is Pen, Ue-Li; Macquart, Jean-Pierre; Deller, Adam T.; Brisken, Walter 2014. 50 picoarcsec astrometry of pulsar emission, *MNRAS*, 440, 36.

Cosmic Structure: my background subject since PhD work, over 100 papers with over 7000 citations since 1994. A recent example includes Pen and Turok 2016, Shocks in the early universe,

PRL 117, 1301, and Yu et al 2017, Differential Neutrino Condensation onto Cosmic Structure,  
Nature Astronomy (in press)