**President**
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**Vice President**
**Greg Halac**
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**Treasurer**
**Charlie Davis**
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**Secretary**
**Kathy Lowry**
secretary@nocoastro.org

# Northern Colorado Astronomical Society – minutes - Membership meeting 10/1/2026

The meeting was held in the Otterbox Dome at the Fort Collins Museum of Discovery and was presided over by Vice-President Greg Halac.

Refreshments (provided by Greg Halac) and the October "Tonight's Sky" video presentation preceded the formal meeting.

## Agenda:

### 1. Reports:

Treasurer –Charlie Davis
New Members –Greg Halac
Outreach –Greg Halac

### 2. Announcements

### 3. Tonight's Guest Speaker:

**Nikhil Patten:** Mass-Loss Rates for OB Stars at the Center of Bowshock Nebulae

## Attendance:

**In person = 34 Online = 9 Total = 43**

## Membership:

**We currently have 177 active members in NCAS**

# 1. Reports

## Treasurer's Report

| STATUS of ACCOUNTS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| G/L Code | Account Title | | Each | No. | Actual | | Current On | | Last Month |
| | No. of 2026 Active Members | | | | 177 | | 27-Sep-2026 | | 173 |
| | Checking Account | | | | $1,537.20 | | 27-Sep-2026 | | $1,537.20 |
| | PayPal Account | | | | $1,524.29 | | 27-Sep-2026 | | $1,445.40 |
| | CD | | | | $2,142.06 | | 23-Jul-2026 | | $2,142.06 |
| | T-Shirt Inventory | | $20.00 | 4 | $80.00 | | 2-Mar-2026 | | $80.00 |
| **Total** | | | | | **$5,283.55** | | | | **$5,204.66** |

## Balance Sheet

| NCAS 2026 INCOME | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| G/L Code | Account Title | Each | Actual | | Budget* | | Remaining $ | % of Budget Received | Since Last Month |
| 18000 | Memberships Paid in CY 2026 | $30.00 | 143 | $4,350.00 | 167 | $4,779.00 | $429.00 | 91% | $120.00 |
| 19000 | Donations | | | $84.54 | | $250.00 | $165.46 | 34% | $0.00 |
| 20000 | T-Shirt Sales | $20.00 | 1 | $20.00 | 5 | $100.00 | $80.00 | 20% | $0.00 |
| 21000 | Equipment Sales | | | $0.00 | | $0.00 | $0.00 | | $0.00 |
| **Total** | | | | **$4,454.54** | | **$5,129.00** | $674.46 | 87% | **$120.00** |

* membership dues shown are after estimated PayPal fees are subtracted

| 2026 ACTUAL vs. BUDGET YTD EXPENSES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| G/L Code | Account Title | Due | Each | No. | Actual | Budget | Remaining $ | % of Budget Remaining | Since Last Month |
| 1000 | FoCO MOD Donation | FEB | $800.00 | 1 | $800.00 | $800.00 | $0.00 | 0% | 0.00 |
| 2000 | Insurance | JAN | $315.00 | 1 | $403.75 | $315.00 | ($88.75) | -28% | 0.00 |
| 3000 | Member Meetings | | $40.00 | 12 | $392.08 | $480.00 | $87.92 | 18% | (34.95) |
| 4000 | Dark Sky Membership | JAN | $100.00 | 1 | $100.00 | $100.00 | $0.00 | 0% | 0.00 |
| 5000 | State of CO Filing Fee | JUN | $25.00 | 1 | $25.00 | $25.00 | $0.00 | 0% | 0.00 |
| 6000 | AL League Dues $10+ | JUN/OCT | $6.00 | 167 | $952.00 | $1,012.00 | $60.00 | 6% | 0.00 |
| 7000 | PayPal Fees | | $1.54 | 150 | $213.17 | $231.00 | $17.83 | 8% | (6.16) |
| 8000 | Outreach Supplies | | $55.00 | 12 | $378.75 | $660.00 | $281.25 | 43% | 0.00 |
| 9000 | Printing | | | | $312.00 | $800.00 | $488.00 | 61% | 0.00 |
| 10000 | Special Events | | $125.00 | 2 | $0.00 | $250.00 | $250.00 | 100% | 0.00 |
| 11000 | Scope Loan Program | | | | $0.00 | $200.00 | $200.00 | 100% | 0.00 |
| **Total** | | | | | **$3,576.75** | **$4,873.00** | **$1,296.25** | 27% | (41.11) |

## New Members – Greg Halac

### Welcome to the club!

**Richard Atkinson**
**Lisa Munkelwitz**
**Kevin Wollbright**
**Bibek Dhakal**

## Outreach Report – Greg Halac

COMPLETED EVENTS

| Date | Start | Site | Event | Duration | Guests | Volunteers | Notes |
|---|---|---|---|---|---|---|---|
| 9/4/26 | 20:00 | FRCC Observatory | | 1.5 | 25 | 2 | Mostly cloudy |
| 9/4/26 | 20:30 | LCP Devil's Backbone | | 2 | 22 | 7 | Dodged clouds all night |
| 9/11/26 | 20:00 | LCP Hermit Park | | 2.5 | 16 | 5 | Intermittent clouds |
| 9/12/26 | 10:00 | Centerra | Solar | 3 | 233 | 4 | Long day in Sun - fun |
| 9/12/26 | 20:00 | CSP Jackson Lake | | 3 | 88 | 4 | Overrun |
| 9/14/26 | 20:00 | Drala Mtn Ctr | Private | 2 | 29 | 7 | Passing clouds - dark |
| 9/19/26 | 11:00 | FC Old Town Lib | Solar | 3 | 155 | 5 | 2hrs clear |
| 9/19/26 | 19:30 | Lvld Firefly Meadow | | 1.5 | 27 | 9 | Dodged clouds, no Saturn |
| 9/25/26 | 19:00 | Fossil Crk Pk | Help Nite | 1.5 | 1 | 1 | Quick fix |
| 9/26/26 | 11:00 | Lvld Library | Solar | 2 | 118 | 4 | 90min clear |

CANCELED EVENTS

| Date | Start | Site | Cause |
|---|---|---|---|
| 9/5/26 | 20:30 | NCAS Dark Sky Event | Clouds |
| 9/6/26 | 20:30 | NCAS Dark Sky Event | Clouds |
| 9/15/26 | 19:30 | Poudre Learning Ctr | Clouds |
| 9/16/26 | 19:30 | High Plains Env Ctr | Clouds |
| 9/18/26 | 19:30 | FCNA Fossil Creek Res | Clouds |
| 9/29/26 | 19:15 | Poudre Learning Ctr | Clouds |

## Outreach Report (continued) – Greg Halac

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### UPCOMING EVENTS

| Date | Start | Site | Event | Duration |
|---|---|---|---|---|
| 10/2/26 | 19:30 | Lvld Sylvan Dale | | 1.5 |
| 10/3/26 | 19:30 | LCP Red Mtn | | 2.5 |
| 10/9/26 | 19:00 | NCAS Dark Sky Event | | 2 |
| 10/9/26 | 19:00 | LCP Hermit Park | | 2 |
| 10/10/26 | 19:00 | NCAS Dark Sky Event | | 2 |
| 10/10/26 | 19:00 | CSP Jackson Lake | | 2 |
| 10/14/26 | 19:00 | Poudre Learning Ctr | | 1.5 |
| 10/15/26 | 18:00 | Severance Lib | | 2.5 |
| 10/16/26 | 19:00 | LCP Devil's Backbone | | 2 |
| 10/17/26 | 19:00 | Grover, CO | | 2 |
| 10/20/26 | 18:30 | McGraw ES | | 1.5 |
| 10/21/26 | 19:00 | Fall River ES | | 1.5 |
| 10/23/26 | 18:00 | Fossil Crk Pk | Help Nite | 2 |
| 10/24/26 | 12:00 | FCMoD | Solar | 2 |
| 10/30/26 | 18:00 | FCNA Bobcat Ridge | | 2 |

**Outreach Milestones:**

- Joe Adloch = 100 events
- John Caldwell = 775 events
- Bruce Lowry = 50 events

## 2. Announcements:

Dark Sky Weekend – Centennial Wy





Joe Izen's house, Friday evening 10/9 and Saturday 10/10

- Bortle 2.5 skies – very dark
- Abundant wildlife and daytime activities in the Snowy Range
- Joe has a limited amount of indoor sleeping options, or you can camp. Please see the invitation sent out by Greg M for details. Email Joe to reserve an indoor spot

## 3. Tonight's Guest Speaker: Nikhil Patten

Mass-Loss Rates for OB Stars at the Center of Bowshock Nebulae

Bio information:

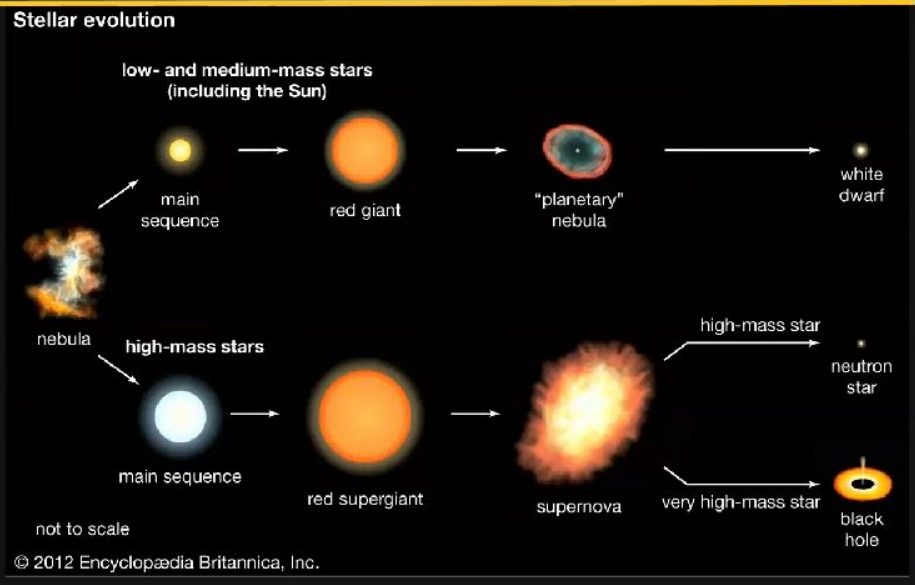
Nikhil is a sixth-year graduate student in Astronomy at the University of Wyoming and was originally from New Jersey. He is also an avid amateur astrophotographer. Nikhil loves mixing hobbies and his dissertation work. Those same stars that are the focus of his dissertation are also the objects he images with his personal 200mm telescope.

Here are some examples from his presentation:

## Outline

- HR diagram
- Fates of stars
  - Low- and intermediate-mass stars
  - High-mass stars
- Interstellar Bubbles/Stellar bowshock nebulae
- Paper I: What stars power bowshock nebulae?
- Paper II: Measurements of mass-loss rates using the bowshock method
- Closing thoughts

## Fates of Stars



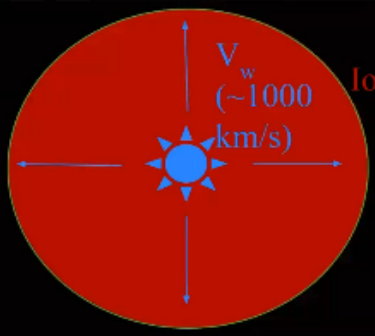

## Fates of Stars—High-mass stars



WR134 (Wolf-Rayet star, OB star before supernova)

Taken by me!

## Interstellar Bubbles




Ionizing UV photons and large luminosities from OB stars give rise to stellar winds

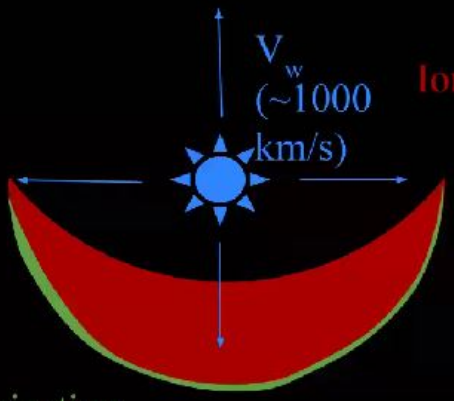
Ionized gas and hot dust

Ionization front/shock front

Steady-state nebula that persists for the star's lifetime

Neutral gas and cool dust

## Stellar Bowshock Nebulae




Ionizing UV photons and large luminosities from OB stars give rise to stellar winds

Ionized gas and hot dust

$V_a$ (supersonic) 10–100 km/s

Ionization front/shock front

Steady-state nebula that persists for the star's lifetime




Many of us were left wondering how many of our observations/photographs of these colorful and interesting nebulae in our Milky Way were actually examples of “Bowshock Nebulae”. Another thought was about how many of our favorite stars are actually rogue stars that are moving along and producing a Bow Shockwave of their own.